

tain of the directors. It also happened that the commercial business of the states lying between the great lakes and Puget Sound, which had been "booming" up to 1891, received a check, so that the traffic of the road, which up to that year had shown large annual increases, began to exhibit some falling off. All of which, of course, gave added embarrassment to the directors who were struggling with Wall street loans.

In short, the opinion of railroad men seems to be that, in the not far-distant future, when general business in that territory takes on the revival which it is certain sooner or later to see, the Northern Pacific, like other Western roads, will rise out of its troubles to be, under good management, again a prosperous company. The defense of the directors against the charges made upon their past acts should be read with care. It is easy now to make complaint, but it would have been much harder to avoid some mistakes in deciding upon the perplexing problems of the times.

A STOCKHOLDER.

A Defect in Organization.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Few of the newspaper writers who speak of "American methods" in railroad work and of American railroad organization as compared with English and Continental organization seem to realize the great differences in organization between different American railroads. In glancing over the lists of officers of the various American systems one at once notices that every road has a president, a number of vice-presidents and chiefs of the operating, traffic, financial and legal departments; so that on paper it would seem that their organizations were all practically the same; but when it comes to the actual work of the railroad—deciding exactly what is to be done and attempting to do it—American railroads differ very widely, and the principles in which they differ, although they are occasionally outlined in the organizations established by boards of directors, are never detailed in print, as people who try to get information a little out of the common are apt to find out.

To tell the truth, when it comes to details this important matter of deciding actually what to do is often left to a subordinate who can only look at questions from one point of view. On many railroads the Traffic Department is supreme and orders things done without the slightest regard to what it costs to do them. On other railroads the Operating Department is supreme and will not do anything which looks too expensive. One result, and not an unimportant one, is that when anything goes wrong the sufferer, that is the man who wants something exceptional done, is kept running from one department to another to find out who is actually in control. A far more important result is that sometimes a railroad refuses to do work which would pay it well, and at another time undertakes to do a work which pays no profit. All these could be avoided by a slight change in organization.

Suppose, for example, that a man wishes a special train run. He will probably not make a mistake in applying to the general passenger agent of the road over which he wishes to travel, and if he gives that official time enough he will probably succeed in making an arrangement with him. But it by no means follows that the general passenger agent in actual practice decides himself whether or not this special train is to be run. On some roads he does so decide, and may even be in position to order the division superintendent to run the train without consulting the general manager or general superintendent. On other railroads he is obliged to refer the matter to the head of the operating department, and that official will decide whether or not the train shall be run. Indeed, cases have been known where the operating official will ask how much the passenger man expects to receive in the way of fares, and is influenced by this in saying whether he will or will not run the train.

Again, take the case of a certain lot of freight which it is proposed to run through between given points without transfer. In some cases the question is decided by the men of the traffic department, who may give their instructions direct to the agent receiving the shipment; and in other cases the question is decided by the operating department, which is guided very largely by the amount of freight offered, and not, perhaps, as much as it should be, by the amount of money which the freight will bring in.

In theory, the operating and the traffic departments of a railroad must be under some one head, either the general manager, the vice-president, or the president; but, in actual practice, the lowest officer with power to decide both traffic and operating questions, is usually of such a rank that it is impracticable for him to attend to all of the small questions which are daily brought up involving both operating and traffic points, so that such questions are usually decided by an official who looks at them from only one point of view; and if there is a difference of opinion between the heads of the two departments, it is usually settled, by the perseverance or the obstinacy of one or the other individual.

The cases which I have spoken of are extreme. Probably neither method is described with absolute correctness, although roads are run, and run successfully, in both ways. When the heads of both the operating and the traffic departments are sensible men, and when they

have the required number of sensible men to assist them, questions of this kind can be settled between the two departments without any great friction and generally with good results, but it seems as if in many cases matters could be expedited if the representative of an officer with full power—call him vice-president or what you will—should supervise matters where it is necessary to settle, and to settle quickly, any case where the traffic and operating departments may not agree. As things are now arranged on many railroads the obstinacy of the operating men can block almost any scheme of the traffic department. On other roads the over-zealous traffic man can get the operating department into no end of difficulty. Indeed, it seems not improbable that on the two railroads we have alluded to above the present methods of doing business may have arisen from obstinacy or excess of zeal on the part of some chief of department many years ago.

In other business, as in manufacturing, the decision as to what is to be manufactured and exactly what it is to be sold for is considered worthy of the attention of the chief of the concern, and I hardly see why in railroad work the decision of exactly what shall be done, not only in the matter of limited expresses and time freight trains, but in every detail of railroad work where the convenience of the public is in any way concerned, should not be regarded as a most important function and should not be looked into carefully by one of the principal officers of the road, aided by an efficient staff.

L. E. H.

The Dangers of Oil Transportation.

BOSTON, Feb. 18, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with interest your report of the collision at Wann, Ill., the oil fire following it, and your editorial remarks of January 27. I had nearly 12 years' experience in handling oil trains, and had two oil fires the result of accidents. The first, and worst one, occurred the second day after I took charge of the road on which it happened. It was caused by the train breaking apart, and the detached part running into the front part. There was no explosion, though seven cars of oil were burned up. The second fire was caused by a broken axle under an oil car. The best information which could be had at the time was that soon after the breaking of the axle an explosion occurred, blowing the dome off the tank and setting fire to the oil. The burning oil ignited the woodwork of the frames and trucks of two other cars loaded with oil, burning them so badly that it was not thought safe to haul them (empty) to the shop for repairs. The fire on these last-mentioned cars was extinguished. There was no explosion and no loss of their lading. Explosions do not always follow the wreck of an oil car, and fire does not always follow; but there is so much danger that we considered ourselves fortunate when a wreck occurred without these results.

It is not easy to account for the explosions which sometimes occur, nor for the fires without explosion which often occur when oil tanks are wrecked. * * * I have seen oil burning which was fired by sparks produced by pulling a dismantled iron tank over the stones at the foot of an embankment, and I never knew of a fire (except one) which could be traced to any open fire. It would seem, if refined oil is what it purports to be and should be, that it would not take fire so readily as crude oil, but I have known of one collision with a car of refined oil in barrels, where fire followed so quickly that passengers had a narrow escape and the conductor was quite badly burned.

In addition to the danger of fire and explosion at the time of a train accident, there is another of which I have known one instance. It arises from free gas. All oil exposed to the air gives off gas—crude oil more rapidly than refined, and in hot weather more rapidly than in cold weather. The gas from crude oil, benzine, gasoline, naphtha or refined oil is a heavy gas which does not rise, as is generally expected of inflammable gases. A room filling with ordinary illuminating gas fills from ceiling to floor, but with these heavy gases it fills from floor to ceiling. The gas arising from oil spilled over the ground may lie close and explode from sparks or fire with which it comes in contact. Such explosions have occurred. Cars which have gone hundreds of miles (with the small vent open and the manhead off) after unloading sometimes contain gas enough to explode with considerable force.

A singular effect of the constituents of crude oil is their anæsthetic effect. When men are sent into the tanks to clean them, a man is sent to watch them, so that if they begin to sing or dance or act otherwise lightheaded (as is common in partial anæsthesia), they may be taken out into the fresh air.

Your comment indicates that the cause of the explosion was a car having "little or no vent." Unless there has been a great change in a few years, the only vent in any oil tank is in the top of the dome and is about half an inch in diameter. After loading the tank, the manhead is screwed down and no vent is left except the small vent in the dome. This small vent is sometimes considerably reduced by putting in a screw-eye to carry a bellrope. When a tank of oil is on fire, the danger of explosion has passed.

"The old expedient of making a vent in a burning tank by firing a musket ball through it," etc.—what good would that accomplish? The musket ball would make a hole half an inch in diameter, which would not be

large enough to prevent an explosion. It would simply liberate more oil to run over the ground and probably spread the fire if it run into a stream. The water would carry the oil quite a distance with danger of fire all the way if the oil were accidentally, ignorantly or maliciously ignited.

. . . Transfers of bulk oil under any ordinary circumstances can be quickly and easily made with a siphon from any point which you have steam hose enough to reach and pipe enough to carry the oil to the new car. I have transferred the oil from an 80-bbl. tank which was down a bank to an empty car on main track in 18 minutes, with only a loss of two or three barrels, which the siphon would not lift.

The singular thing in this case (if correctly stated) is that some of the tanks were allowed to burn up. I remember a case of fire in an oil car which had been burning for hours which was quickly and easily extinguished, although the tank was about half full of hot oil when the air was shut out and the flames smothered. I remember being sent for in hot haste to send all the empty cars possible to be used to load oil from a 50,000-bbl. tank which had been struck by lightning and was on fire. The fire in this tank was smothered out. It would seem, under the circumstances mentioned, the fire ought to have been extinguished in the tanks which burned up; but of course it is much easier to criticize after events have occurred than to tell just what is best to be done at the moment.

SENEX.

Tests of Compound and Simple Locomotives.

During the months of September, October and November, 1892, tests were made on the Cincinnati, New Orleans & Texas Pacific Railway of a Baldwin compound and a simple locomotive made by the same firm. The tests were made under the supervision of Mr. James Meehan, Superintendent of Motive Power and Machinery, and what follows is a summary of his report to Mr. R. Carroll, the General Manager of the road.

Before beginning the test each engine was put in first class repair, the boiler washed, the tubes bored out, and exhaust nozzles cleaned. The weight of each locomotive and other data are given in the following table:

	Simple.	Compound.
Engine number.....	531	604
Date when built.....	May, 1889.	July, 1892.
Cylinders	19 in. x 24 in.	13 in. and 22 in. x 24 in.
Class	10-wheel.	10 wheel.
Driving wheel, diam.....	62 in.	68 in.
Weight on drivers.....	80,000 lbs.	84,800 lbs.
Weight, total.....	111,000 lbs.	120,000 lbs.
Type of boiler	Extended wag on top.	Extended wagon top.
Boiler diam., smallest ring.....	56 in.	58 in.
Heating surface	1,566.21 sq. ft.	1,821.93 sq. ft.
Grate surface.....	18.81 sq. ft.	18.40 sq. ft.
Nozzle.....	3 3/4 in. single.	3 3/4 in. double.

The water delivered to the boiler was measured by a 2-in. Thomson meter placed in the feed pipe between the injector and tank, a reading of the meter being made just before leaving one terminal and upon arriving at the other. The three-way cock was connected with the cylinder by a 3/4-in. pipe, the connection on the simple locomotive being made in the usual manner, and the pipes on the compound being crossed, so that one instrument might be used, and to avoid the necessity of assembling the diagrams after taking them. The speed was read from the indicator of a Boyer recorder that received its motion from the front truck axle. The coal was weighed on to the tender at one terminal and what remained at the other was weighed back. The total coal given is that used between terminals. Particular care was taken to have the conditions, under which each locomotive was tested, as nearly the same as possible. With this object in view the weights of trains were increased or decreased as much as available means would allow; the same engineer and fireman handled both engines, and the running time over the road was made as uniform as possible. During the interval between the time of testing the compound and the time the simple was tested the schedule time was shortened five minutes for south bound trains and 15 minutes for north bound trains, but it will be noticed in the recapitulation that the actual running time for 10 trips was 10 1/2 minutes longer for the simple than for the compound.

Table No. 1 gives the results obtained from the indicator diagrams, and Table No. 2 gives the final results and averages and percentages for the 10 trips of each locomotive. Table No. 2 shows a saving of about 35.5 per cent. in fuel in favor of the compound, but the compound has 16.3 per cent. more heating surface with about the same grate surface as the simple locomotive, which accounts for a part of the 35.5 per cent. fuel saving. It is difficult to determine just how much saving is due to the greater heating surface and the resulting increased boiler efficiency.

Table No. 1 shows that more work was done in the low pressure cylinder than in the high pressure cylinder of the compound locomotive, and that the percentage of variation is not constant for the different points of cut off.

The results obtained from the test have been compared with the records kept by the comptroller of the road; these records are based on the miles run per ton of coal and by these the compound shows a greater percentage of saving over the simple engines than is shown by the test. The average coal consumption during September and October for three simple engines, Nos. 530,

TABLE NO. I.—DATA REFERRING TO INDICATOR DIAGRAMS, LOCOMOTIVE TESTS—C., N. O. & T. P. RY.

Card num-ber.	Speed in miles per hour.	Speed of piston in feet per min.	Revolutions per min.	Boiler pressure, lbs.	Throttle opening.	Cut-off.		Mean effective pressure.		Indicated horse power.			Remarks.
						H. P. cylinder.	L. P. cylinder.	H. P. cylinder.	L. P. cylinder.	H. P. cylinder.	L. P. cylinder.	Total.	
1	5	96	24	165	Full	20 1/4	.....	62.00	70.50	47.87	155.92	203.79	Compound No. 604.
2	8	156	39	175	"	20 1/4	.....	93.75	49.50	117.64	177.89	295.53	Weight of train, 330 000 lbs.
3	19	372	93	180	"	18 1/2	.....	98.75	42.50	295.49	364.22	659.71	
4	28	548	137	170	"	20 1/4	.....	91.50	37.25	403.33	470.27	873.60	
5	44	968	217	185	"	14 1/2	.....	77.00	27.75	351.80	363.12	714.92	
6	29	444	111	165	"	20 1/4	.....	66.25	22.50	462.56	449.91	912.47	
7	21	455.2	113.8	140	"	20 1/4	.....	H'd end.	Cr'k end.	H'd end.	Cr'k end.	788.95	Simple No. 531.
8	23	498.4	124.6	133	"	19 1/2	.....	89.00	101.25	393.01	395.94	888.95	
9	19	911.6	102.9	140	"	19	.....	95.00	94.00	335.92	332.38	668.30	
10	33	715.2	178.8	145	"	9 1/2	.....	66.50	65.00	4 8.59	399.37	807.96	Weight of train, 586,000 lbs.
11	44	953.6	238.4	120	"	6 1/2	.....	40.00	39.50	327.69	323.59	651.28	
12	54	1,170.4	292.6	122	"	5 1/2	.....	26.00	26.25	261.42	363.93	525.35	

TABLE NO. II.—FINAL RESULTS, LOCOMOTIVE TESTS—C., N. O. & T. P. RY.

	Eng. 531, simple.	Eng. 604, compound.	Percentage of saving or excess.
Number of runs made	10	10	.....
" " engine-miles made	953	933	.....
" " cars hauled	69	71	2.9 %
" " car-miles made	6,437.7	6,624.3	2.89 %
Weight of trains hauled, tons	2,023	2,064.5	2.05 %
" " all coal used, lbs.	60,590	40,165	33.7 %
" " coal used per engine-mile (lbs.), average	64.94	43.04	33.7 %
Weight of coal used per car-mile (lbs.), average	9.41	6.06	35.5 %
Weight of coal used per ton-mile (lbs.), average .....	.321	.208	35.2 %
Water evaporated per pound of coal, average, pounds	5.692	7.326	23.7 %
Total minutes used, terminal to terminal, all runs	1,895	1,911	16 min. x
Total minutes stopped, all runs	171	197.5	26 1/2 min. *
Total minutes actual running time, all runs	1,724	1,713.5	10 1/2 min. *
Total minutes made up, terminal to terminal, all runs	71	64	7 min. x
Average speed, miles per hour, all runs	32.7	32.63	.07 miles x
Average engine-miles run per ton of coal	32.58	48.1	15.52 miles *
Average car-miles run per ton of coal	212.54	331.5	119.0 miles *

* Favor 604. x Favor 531.

531 and 532, was one ton to 28.1 engine miles or 173.8 car miles, while the same records show that the compound made 40.5 engine miles and 259.5 car miles per ton of coal.

Mr. Meehan assumed that 10.5 per cent. of the saving shown by the compound over the simple locomotive was due to the greater heating surface of the former, and that the remaining 25 per cent. of saving was due to the increased number of expansions; from this he calculates that, had all the road locomotives of the road been compounds, there would have been a yearly saving of about \$50,000.

Flaws in the Standard Code.

The experience of a number of superintendents with the standard code of train rules makes an interesting chapter in the report of the last meeting of the American Society of Railroad Superintendents, which has just been issued by Secretary Hammond. These letters were received several months ago and were presented at the October meeting, but they were not read and they are now available for the first time. The most interesting replies are those pointing out defects, real or fancied, in the rules as formulated by the Time Convention. As these criticisms express the views of many railroad officers besides those who sent them in, we present a synopsis of them.

Rule 20, regarding putting new time tables into effect, is criticised by Mr. J. G. Osborne, of the Norfolk & Western. This rule has probably caused as much trouble as any one rule in the code. It is generally admitted, we believe, that it is easy enough to make up a combination of circumstances in which the rule, if applied, will cause serious delay; but, as we understand it, the framers of the code never claimed that this, or any rule that could possibly be made for this purpose, would answer in every case without the use of the telegraph. Mr. Osborne's complaint is based on the assumption that a new time table takes effect at noon, and then he goes on to make a change which will produce two trains of the same number on the same day, and asks how Rule 20 can be carried out if the telegraph fails. It seems to us that the obvious reply would be: Change the time table at midnight instead of noon.

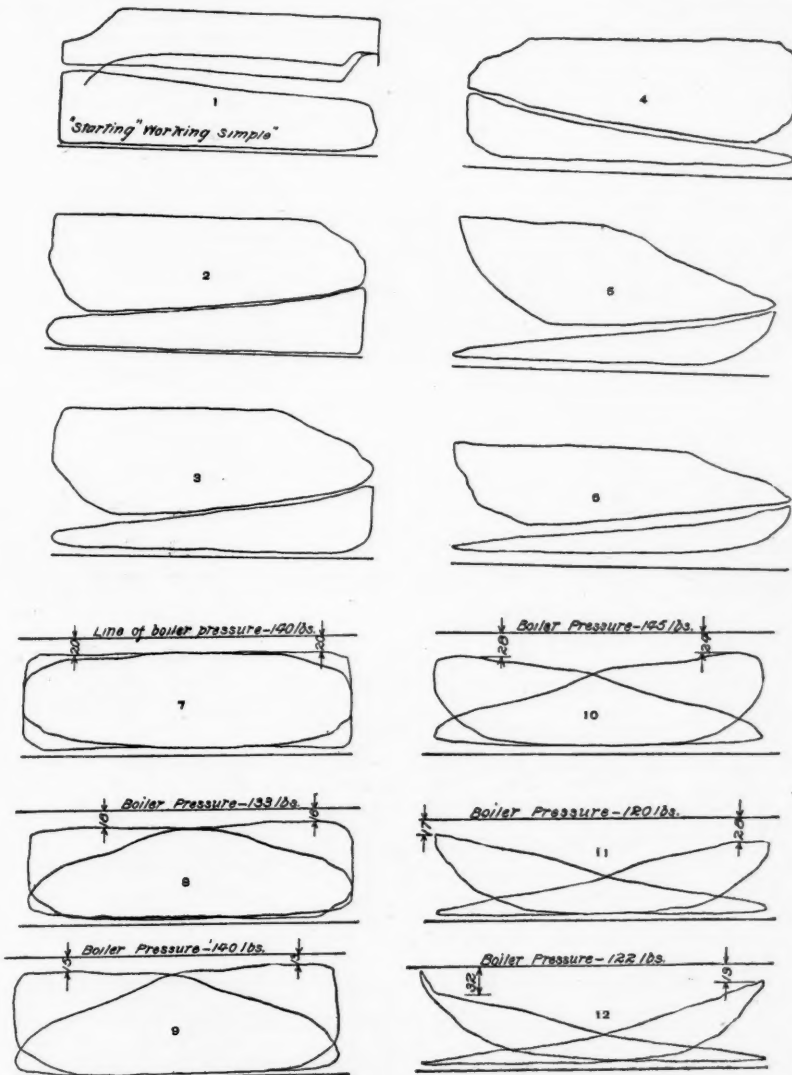
Mr. E. A. Gould, of the Wabash, would amend Rules 39 and 34. He requires trains to carry flags at night as well as in the day time. We believe this has been considered by the American Railway Association. At any rate, the diagrams in the back part of the standard code show both flag and light for night, except in the case of locomotives running without cars, and of trains being pushed. Mr. W. H. Blood, of the Long Island road, calls attention to the liability of confusing the whistle signal of Rule 45, first clause, with that of Rule 46. It will be remembered that an error in this matter was recently noticed in the *Railroad Gazette*, an engineman having called in a flagman when he intended only to call a switchman. Mr. Blood would also have the whistle signal of Rule 48 used for the benefit of trackmen. Mr. A. W. Johnston, of the New York, Chicago & St.

Louis, thinks it would be desirable to have the code of lamp signals (Rules 59 to 63) extended or modified to cover yard work. This has also been discussed in the *Railroad Gazette*. Yardmen use a number of motions which are not in the code, and which yet are very useful in their work. Moreover, they vary some of the code motions to such an extent that they would not be known by the man who originated them. Mr. Johnston also varies Rule 33. He has freight trains show red both front and rear while running, and he would amend Rule 74 accordingly. He shows red toward the front in order that an opposing train may know when a caboose has not been pulled into a side track so as to clear the main track. As every one knows, the aim of the committee was to avoid showing red to the front as much as possible. The general sentiment was, we believe, that where, on account of a curve, there should seem to be a necessity for indicating to the opposing train that the caboose was clear of the main track, the brakeman should give a hand signal.

Mr. G. D. Lawrence, of the Louisville, New Orleans, & Texas, calls attention to the fact that Rule 89 prescribes too short an interval (five minutes) between freight trains. This is a fair criticism of the views of the train rule committee, for they inserted the word "five" in the rule; but it is hardly a criticism on the code, for the changing of that word to 10 or any other desired number is a legitimate change for any road to make. The same gentleman criticises Rule 90, which forbids trains to start for a meeting point unless they have full schedule time in which to get there. He says they ought to have 20 or 30 minutes. His reasons are theoretically

very good, but we hardly think he means to apply his criticism in the case of passenger trains.

Rule 95 is criticised by Mr. J. W. Dawson, of the Kanawha & Michigan, who wants to know how trainmen shall ascertain which trains have arrived, and whether the engineer should go to the telegraph office. Mr. O. E. McClellan, of the Pennsylvania, recommends that Rule 99 be made more binding on trackmen. The Pennsylvania rule for trackmen (which is not in the standard code) simply requires protection, in somewhat general terms. This is the case on the majority of roads we think. Mr. Johnston, before referred to, speaks of Rule 110, in connection with which he uses a printed form, both to order signals displayed and also for running without signals. Mr. Dawson has found operators who failed to notify trains as required in Rule 112 in consequence of a mistake in reading it. They construed the words "the latter" to refer to the switch tender alone.



Indicator Diagrams—Cincinnati, New Orleans & Texas Pacific Tests.

Mr. Dawson also presents an argument for the universal use of Rule 524 B. He objects to the insertion in the standard code of two such radically different rules as 524 A and 524 B, overlooking the fact that they were put in for the very reason that the arguments pro and con were so evenly divided that unanimity was impossible of attainment.

There are a number of criticisms of the forms of train orders. Two of these are by Mr. Dawson. He wants form B (2) modified so that when a slow train is run ahead of a fast one the latter shall be required not to exceed the schedule speed of the leading train. He points out a difficulty in the use of form E (2) as affected by the second paragraph of Rule 510. If the wire fails, the order becomes a hold order, which remains in force indefinitely. Mr. Dawson sees no reason why the train, if ordered to wait a certain time, should not proceed when the time expires.

Mr. Osborne wants to know whether a train running under an order made on form G (1) should carry white signals. He thinks they should be carried, as there is no opportunity to notify trackmen. The criticism does not apply to G (2), as an order of that form, being a supplement to the time table, must, of course, be delivered to trackmen. Mr. Johnston says he has found it necessary to make a special form for running trains ahead of time. Mr. Blood notes the lack of a form of order for use when trains are run over a part of the double track as single track. Mr. Gould would like a rule requiring trains to protect themselves when backing out of a side track. He does not say how generally he would apply this, but presumably he means it for

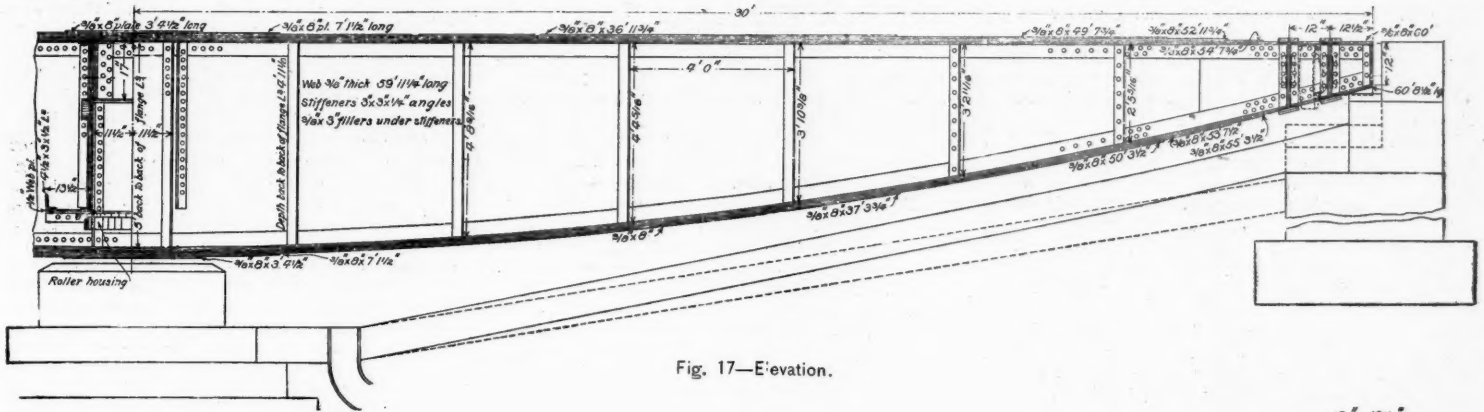


Fig. 17—Elevation.

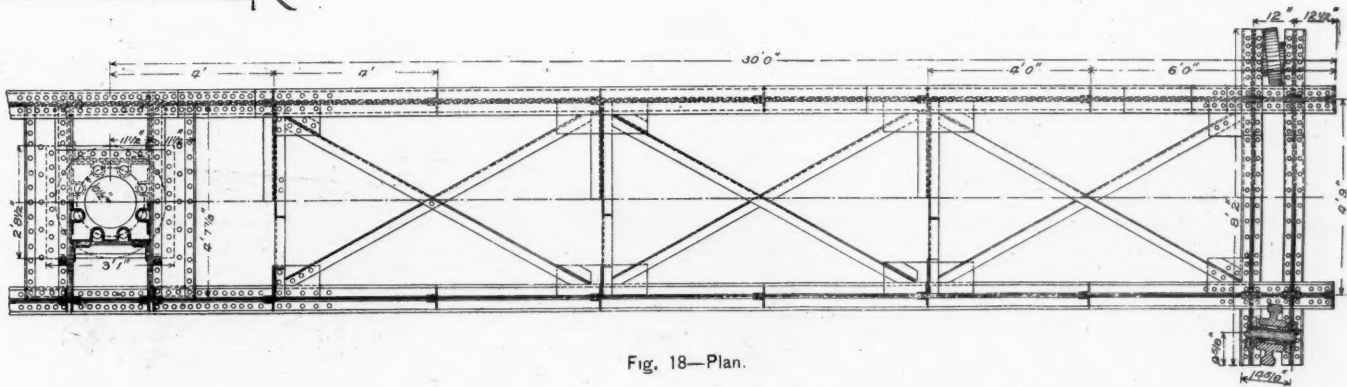


Fig. 18—Plan.

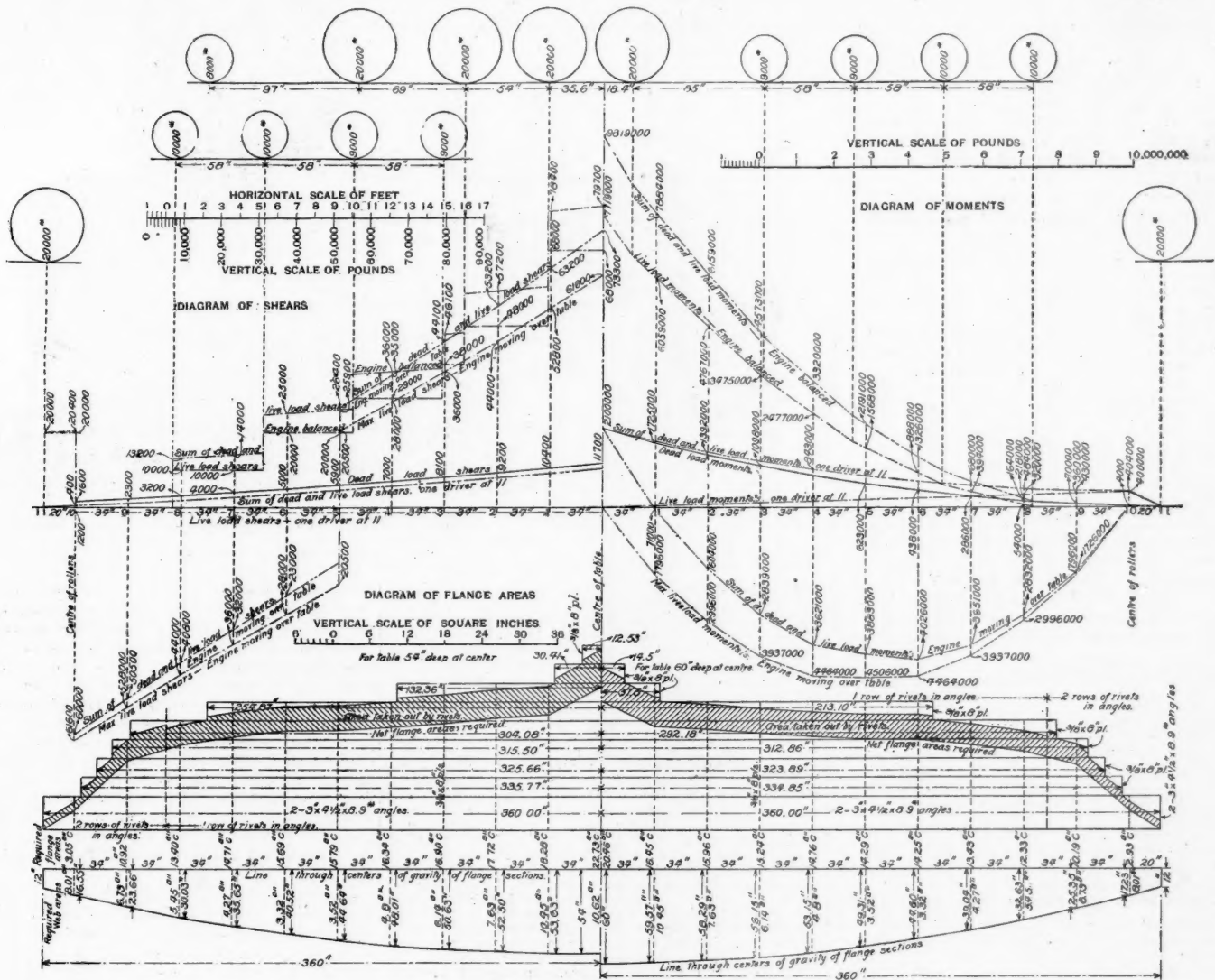


Fig. 19—Strain Sheet—Riveted Girder Turntable, 126 Tons Capacity, 60 ft. Diameter, 1891.

THE EVOLUTION OF THE RAILROAD TURNTABLE.

having just enough elasticity to allow the solid girders to adjust themselves to the shock of the load as it comes on or goes off of the table. 3. The hemisphere has been inverted, and placed as high as it could be to allow the locomotive to clear the centre cap, lowering the centre of gravity of the load to the lowest possible point. The lower side of the hemisphere has been provided with a dowel, $5\frac{1}{2}$ in. diameter, that passes down through the top roller housing and penetrates the eye of the lower roller housing, which dowel completely protects the conical rolls from being disturbed by any end thrust that the table may receive. 4. The lower roller housing has been placed on top of

the pedestal, so that it is level and stationary and cannot tip, as it did in the old table. The new centre box is just large enough to form a sleeve over the outside of the pedestal, reaching nearly to the base, provided at its lower end with a groove, machined out true and round, and furnished with a nest of vertical rolls, $2\frac{1}{2}$ in. diameter by 3 in. long, fitting closely to the pedestal, a roller path being turned on the pedestal near its base long enough to admit of vertical adjustment of the turntable. There being no play or lost motion at the bottom of the platform when the table has to tip to allow the locomotive to pass off or on the table, the provision for this movement has been made at the top, by

the sliding joint at the friction ring between the centre cap and the centre box. All these surfaces have been machine dressed. The suspender bolts are all screwed up hard, so that no undue strain can be brought on any one of them. This arrangement makes the table much easier to balance and to keep level while turning than could be done in the old table. The end carriages that used to break sometimes by dragging on the circular track, as referred to above, have been severed at the point of greatest strain, and spliced with wrought iron, to cushion them from the shock that they usually receive when the engine comes on the table (see the end view of end carriage, fig. 15).

The evidence we have that the solid girder turntable described above (fig. 16) is superior to the best riveted tables we have yet produced, is that the repairs on the solid girder tables for ten years have not been one-twentieth as great as on the riveted tables in fig. 14 and on strain sheet, fig. 11.

Figs. 17, 18 and 19 illustrate a riveted girder table designed to meet the present requirements to turn the heavy locomotives used by the trunk lines. Mr. G. Bouscaren, Consulting Engineer, considers this table will not become flexible with use. I hope it will not, but my experience with turntables is that all riveted tables will become flexible with use, and are subject to destruction from corrosion, two defects to which the solid girder tables are not liable.

This turntable was designed for a Lehigh Valley heavy grade engine, weighing 176,000 lbs., and a tender weighing 76,000 lbs., making in all 252,000 lbs. or 126 tons. The strain sheet was prepared by Mr. G. Bouscaren in 1891, and is for one girder and the wheels on one side of the engine and tender only. The diagrams of moments and shears are calculated for three different positions of the load on table, with wheel bearing at ends:

- 1st. For engine balanced over centre of table.
- 2d. For engine moving over one arm of table. Other arm unloaded.
- 3d. For one pair of driving wheels resting at end of table. Table unloaded.

The maximum stresses due to each of these three positions of load are combined with the stresses from the dead load at each point to find the maximum result at each point. The flange areas are calculated according to Cooper's specification.

The evolution of the turntable having thus been traced, the form of the present standard turntable will be dealt with in a future article.

The Baldwin Compound Street Railroad Motor.

The North Chicago Street Railway Company brought over from Belgium last year a steam motor of new design, about which much was said and for which much was claimed. Some who should have known better prophesied that the steam motor, particularly the Belgian motor, was the street railroad motor of the future. When this was tried in Chicago it was found to be so inadequate in point of power as to be practically worthless, and it was relegated to the lightest kind of switching and terminal work. Moreover, it was so heavy that it was feared it would seriously affect the roadbed, which, while laid with heavy rails, has the ties placed so far apart that the carrying capacity is not as great as at first sight it would seem to be.

The Baldwin Locomotive Works having taken the Belgian motor to repair, requested permission to build one of their own in competition, and the request being granted the motor shown by the engraving with this was built. This is without doubt the most complete and scientific steam locomotive for street railroads ever built, and is in fact a new and novel type of machine. Its power is greatly in excess of that of the Belgian motor, and it is simpler in construction and more complete. One of the special novelties is the steam condenser on the cab roof. The steam is expanded to a very low pressure by the Vaucain compound cylinder, and is then considerably condensed by the condenser. In this way the noise of the exhaust, common with steam motors, is removed almost completely without using a muffler, and therefore without the loss due to the use of a muffler, which always carries considerable back pressure.

The main dimensions follow:

Gauge.....	4 ft. 8 1/4 in.
Cylinders, high pressure.....	5 x 14 in.
Cylinders, low pressure.....	8 x 14 in.
Four driving wheels.....	33-in. diam.
Steel tires.....	2 1/2 in. thick.
Wheelbase.....	5 ft. 6 in.
Weight in working order.....	28,300 lbs.
Boiler, 36 in. diam., straight top of 3/4 in. steel, butt-jointed with double covering strips.....	180 lbs. per sq. in.
Working steam pressure.....	180 lbs. per sq. in.
Firebox, 24 1/2 in. long x 27 1/2 in. wide inside, with grates for coke or anthracite coal.....	
Flues, No. 13 wire gauge, 93 in. number, 1 1/4 in. diam., 317 in. long.....	
Tank, 325 gallons capacity.....	
Lubricator, Nathan No. 7 sight feed.....	
United States metallic packing on piston rods and valve stems.....	
Balanced piston slide valves. No. 4 universal injectors. Cab of steel. Two 12-in. round case headlights. Steam brake on all wheels. Steam condenser on top of cab.....	

This description indicates how perfect and complete are the arrangement and design of parts of this motor; yet in spite of its perfection it has been returned to the builders. Why? For the reason laid down with considerable completeness in the *Railroad Gazette*, Nov. 18, 1892. These reasons are, briefly, too much weight per horse power, and too small maximum capacity at starting. These defects are common to all steam motors for street railroads; and this very perfect locomotive, undoubtedly of great value for dummy lines in suburban districts, is, as we have explained before, no exception to the rule.

Electric Railroads.

The Philadelphia & Allentown Electric Trunk Railroad Co., of which W. R. Grace, of New York City, is reported to be President, secured a charter at Harrisburg last week. The capital is \$1,000,000. The line is proposed to extend from Allentown to Philadelphia, passing through all the important towns between those cities.

Automatic Block Signals on the Liverpool Overhead Railroad.

Engineering of Feb. 10 prints a description of the automatic electric block signals which are being placed on the above named road. The description is not complete and the drawings do not give an adequate idea of the plan on which they are arranged and operated, but we give below the substance of the article. The signals themselves are semaphores, the posts apparently being made of wrought iron. The drawing indicates that there are two colored spectacles in the arm, but it does not appear whether a color is used to indicate "all-clear" or the 45-degree position is to be used to indicate caution.

It appears that the Board of Trade officials have been consulted, and they apparently have expressed a qualified approval of the apparatus. At all events there has been much negotiation with the Board, and the company has ordered signals to completely equip the road, which is seven miles long, double track, and divided into 12 block sections. The work of putting in the signals is nearly completed. The description says:

The home and the distant signals both occur close to the stations, the former serving to admit the trains to the platform, and the latter acting as starting signals to let them into the next sections. Let us imagine a

greatly increased, and advantage is taken of this to economize current, a large resistance being automatically switched into circuit to reduce the current to about .25 of an ampere, which is sufficient to keep the signal at "line clear;" in fact .1 is sufficient. This reduction of the "lowering" current to the "holding" is an essential feature.

The track instrument is a horizontal arm fixed transversely to the track, and it is worked by a bar on the side of the truck of the last car of the train. This is not illustrated, but it seems that the car truck, in passing, pushes the arm to one side and holds it there while the train is moving a distance of 24 ft. Where trains run at high speed, however, Mr. Timmis proposes to use an ordinary rubbing connection, after the fashion commonly proposed in this country for electric signals to be operated by a moving train.

Transportation to the World's Fair.

Some figures of the possible capacity of the various means of transporting passengers between the heart of the city of Chicago and the World's Fair grounds have recently been given out by the World's Fair management. They are not given as official or final, but are



A Steam Street Railroad Motor—Baldwin Compound.

train to be en route between stations No. 3 and No. 4 and watch what happens. It is now protected by the starting signal at No. 3 station, which stands at "danger," and if the home signal at No. 4 be down, it runs to the platform, where it is booked to stop, and as it does so it automatically puts the home signal to danger. It is now protected by two signals, the starting signal at No. 3 station and the home signal at No. 4. If the trains are running on time the starter at No. 4 is down before the train is ready to leave, and as soon as the passengers are seated the train again starts. As soon as the train is completely past the starter, a device on the last car comes in contact with a lever projecting from a box on the permanent way, and breaks an electric circuit, the result of which is that the signal goes to danger and protects the train. There are now three signals set to danger behind the train—the starter at No. 3 station, the home signal at No. 4 and also the starter at No. 4. A hundred yards or so further on the train passes another treadle, by which it makes an electric circuit controlling the starter at No. 3 and the home signal at No. 4. The effect of this is to lower both these signals and to admit the following train to the preceding section; but to prevent all mischance, the starter at station No. 4 is included in the circuit in such wise that unless the signal stands at danger the circuit is not completed, and the two preceding signals are not lowered.

While this provides the essential safeguard for an automatic signal system, it will be seen that the signal which serves for both a starting signal and a distant signal is used under regulations which are somewhat confused. The arrangements for running trains through cross-overs, and protecting them by signals while so doing, seem to be similar in principle to those employed by the Hall Signal Company.

The system is the invention of Mr. I. A. Timmis. The signal arms are worked by electro-magnets. These magnets are said to be a new invention, and to give ten times the power that the old long-pull magnet gave. A magnet measuring 7 in. by 5 in. diameter, and working with a current of 5 amperes and 40 volts, will raise a weight of 50 lbs. at a distance of 2 in. When fitted to a signal, the load upon it, of course, is usually far less than this. When the armature is down the pull is

an interesting approximate study of the matter. The World's Fair Steamship Company, plying on Lake Michigan, touches various piers and runs direct to Jackson Park. The management of the Fair has made a contract with this company by which the company agrees to run a sufficient number of vessels, each with a capacity for 5,000 passengers, to carry 15,000 an hour, and the rate will probably be 10 cents one way. The Illinois Central estimates its capacity for World's Fair business at 30,000 an hour in one direction. The company has eight tracks between the lake front and Jackson Park, four of which will be given up exclusively to through business between the city and the World's Fair grounds, and the others will be available during rush hours. It is supposed that the fare by this route will also be 10 cents.

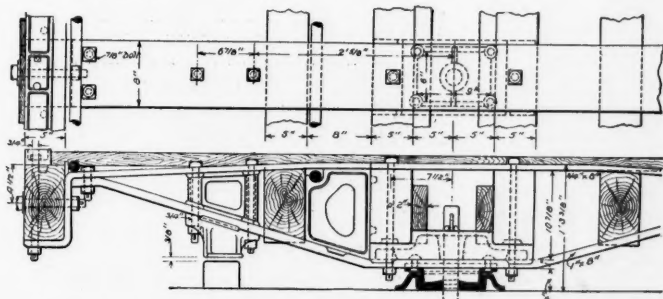
The Baltimore & Ohio, in connection with the Chicago & Northern Pacific, will run trains out of the Grand Central Station at Harrison street and Fifth avenue to a point about 2 1/4 miles west of the lake, thence south to opposite South Chicago, thence northward to the Fair grounds, delivering the passengers at the World's Fair Grand Central Station. This service will have a capacity of about 5,000 an hour. The Alley Elevated railroad expects to handle about 20,000 passengers an hour in one direction at a fare of five cents. There are two cable lines—the Wabash avenue and the State street—which, with various loops, covering a good deal of the city, can handle about 15,000 people an hour each and 20,000, perhaps during the rush hours. This makes a total of 100,000, or, say, 120,000, assuming the maximum capacity for the cable roads, and the management feels confident that this is a safe estimate of the capacity of these means of conveyance. Aside from these there will of course be lines of omnibuses and carriages which can handle a good many people, and there are various other plans proposed, none of which, however, have developed so far as to merit serious consideration.

Of course a large number of the visitors to the World's

Fair will be delivered in the grounds without going into the city proper. The terminal system in the grounds embraces 35 tracks, with a very large car capacity, and this system of tracks has been arranged with a view to safe and quick operation, and is thoroughly signalled and interlocked. At this terminal the various railroads will deliver passengers from the country around who do not enter the city. The World's Fair Steamship Company also proposes to run vessels to various lake points within a hundred miles of the park.

C., B. & Q. Body Bolster for Freight Cars.

We illustrate in this issue the body bolster now standard on the Chicago, Burlington & Quincy for heavy stock, box and furniture cars. It consists, as shown, of a top or tension member of $\frac{3}{4}$ in. \times 8 in. iron, and a 1 in. \times 8 in. compression member. These pieces are bolted together just inside the side sills, the end of the lower member fitting against the top member, which is turned down on the inside and out under the bottom of the side sills, to which it is fastened by vertical and horizontal bolts. A casting, on which the centre sills rest, is placed on the lower member and serves as a spacer for these sills as well as to deepen the truss and afford a support for the centre pin. Iron spacers bolted between the centre and intermediate sills, and between the intermediate and side sills, above the side bearings, bind all parts in place in such a manner as to make a bolster capable of withstanding much hard service.



Eight-inch Body Bolster—Chicago, Burlington & Quincy Railroad.

For 34-ft., 50,000 lb. Stock; 34-ft., 60,000-lb. Box, and 40-ft., 50,000-lb. Furniture Car.

The intermediate sills are slightly cut away at top and bottom, where they pass through the bolster. The side truss rods, as shown, rest on the body bolster, just inside the side sill, a small plate of iron being introduced to prevent the rod chaffing on the sill. The inside truss rods pass beneath the top member just inside the intermediate sills and rest on the cast iron spacer above mentioned. This bolster has been in use for several years and has been so satisfactory that it is now the standard of the road.

The centre pin, as shown, consists of a plain round bar of 1½-in. iron, with a 2-in. split key in the top. This does away with the necessity of cutting the floor, and facilitates the removal of the pin should it be necessary to do so while the car is loaded. The general construction of the cars on which this bolster is used was shown in the *Railroad Gazette* Jan. 27, 1893.

Iron Roundhouse Roof.

The question of the construction of roundhouse roofs is often a puzzle to master mechanics. The illustration shown above is taken from a photograph and shows an iron truss roof designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn., for a roundhouse for the New York, New Haven & Hartford at Hartford, Conn. The roof trusses are entirely of iron with jack rafters, plank and covered with slate. The illustration is so clear and shows the construction of the roof so well that it is hardly necessary to elaborate on the details of the advantages of an iron truss roof on a building of this kind. The same company have lately contracted with the Long Island for a similar roof at Long Island City, N. Y.

The leading dimensions and particulars of this roof are as follows:

Span.....	64 ft. 0 in.
Area of roof.....	20,000 sq. ft.
Pitch of roof.....	16 ft. at centre
Distance principles minimum.....	11 ft. 8 in.
" " maximum..	20 ft. 6 in.
Rafter, two angles.....	3 in. x 4 in. x ½ in.
Main ties, one plate.....	6 in. x ½ in., two angles 3 x 2 x ½
Main struts, four angles.....	2½ x 2½ x ½
Secondary ties, two bars.....	2½ x ½
Secondary struts, four angles.....	2 x 2 x ½
Single 3 in. boarding on iron purlins.....	8 ft 10 in. apart. 6 in. x 2½ in.
Plates, size.....	120,000 lbs.
Weight of ironwork.....	6 lbs.
" " per sq. ft. covered	

Feed Water Purifying.

The Rio Grande Western is experimenting with the Kintzel boiler water purifier, patented by E. T. Kintzel, of Missoula, Mont.

The Liverpool Overhead Electric Railroad.*

The generating plant on this line is calculated for a three minute service for a line nine miles long, each train being capable of seating 112 passengers. The capacity per hour in each direction will therefore be 2,240 passengers. Six Lancashire boilers internally fired, each 30 ft. long by 6 ft. diameter are used, working at 120 lbs. per sq. in. and fired by Vicars mechanical stokers. The boilers and steam pipes are covered with Leroy's non-conducting composition. The dynamo are driven by four horizontal coupled compound engines, with Corliss valve gear, and each capable of indicating 400 H. P., with 120 lbs. steam pressure, at 100 revolutions per minute. The cylinders, $15\frac{1}{2}$ in. and 31 in. diameter, 36 in. stroke. The flywheels are 14 ft. diameter, grooved for nineteen $1\frac{1}{2}$ -in. diameter ropes. Independent surface condensing plant is used, divided into two units each capable of condensing steam from three of the main engines running under full load. The condensing water is taken from the dock adjoining the generating station, and passed through brass tubes. The air and circulating—centrifugal—pumps are driven by small compound vertical engines, having Ferguson's patent triangular connecting rods. The cylinders, $7\frac{1}{2}$ in. and 15 in. diameter, 12 in. stroke. As auxiliary machinery there are two pumping engines for boiler feed, each capable of supplying four boilers. One engine for driving stoker and conveyor—10 indicated horse-power—and two small engines for working the scrapers on the economizer. All steam and feed pipes are arranged to give a duplicate service between boilers, engines and pumps. Arrangements

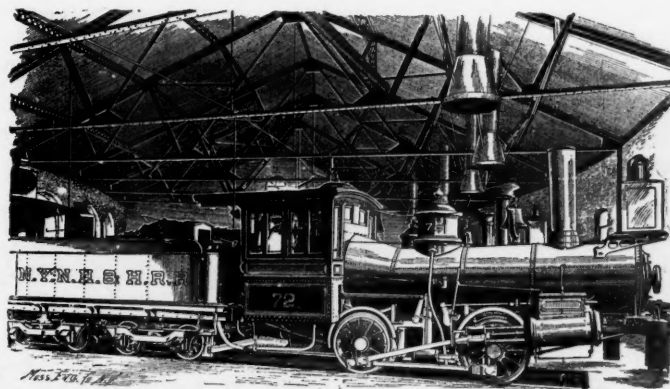
semi-circular ends. In 1880 the Pleasant Valley Electric Street Railway Company secured control of the bridge for the purpose of replacing the old structure with one better adapted to rapid transit purposes. The Company required:

1. A four-track bridge with two sidewalks 10 ft. wide.
2. The old masonry to be used.
3. The maintenance of traffic during the reconstruction.

The contract was awarded to the Iron City Bridge Co. The bridge as finally decided on, consisted of three centre spans of 205 ft. and two end spans of 152 ft. 6 in. centre to centre of piers, with a viaduct approach on the Allegheny end 80 ft. long. The work on the substructure consisted of a new abutment on the Pittsburgh side, 40 ft. north of the old one; rebuilding the tops of all piers, the skewbacks of the old arches being removed and the tops built up to give the pier a uniform section; a new pier on the Allegheny side; removal of the old Allegheny abutment, and building the foundations for the viaduct.

The new steel trusses are of the Pratt type, with subdivided panels and straight top chord, 34 ft. 2 in. deep, and placed 35 ft. 8 in. apart. The first thing done was to remove the roof and side covering of the old bridge and take out the top lateral system, in order to prepare it for the passage of electric cars.

Temporary wooden towers, bolted to the arch timbers and well braced at the top, were erected in the centre of each span in order to give it lateral stiffness. The



Iron Roof over Roundhouse, Hartford, Conn.

Built by the **BERLIN BRIDGE COMPANY**, *East Berlin, Conn.*

are also made so that the engines may exhaust into the atmosphere in case of water not being obtainable at any time for condensing.

Four Elwell-Parker shunt-wound dynamos, each giving an output of 400 volts, 475 amperes, at 400 revolutions per minute, are used. The magnets are of the double horseshoe type, fixed vertically, divided on the horizontal centre line, so that the top half can be readily lifted off to allow of examination or removal of the armatures. The pulley is carried between two bearings, and a coupling being inserted between the pulley and armature shafts allows the latter being taken out without taking off ropes, dismantling pulley or interfering with the set of the bearings. Each dynamo is coupled up through an ammeter to a double-pole automatic magnetic cut-out, which also answers the purpose of main switch. All the machines couple in parallel onto omnibus bars, from which the current is taken by underground "armored" cables to the conductors on the line, a larger magnetic cut-off being inserted carrying the whole of the current. Multiple contact switches and resistance coils in the shunt circuit are employed to regulate the electromotive force of the machines.

The line is generally nearly level, the only grades of any length being one per cent., but the maximum grade is 132 ft. per mile for a short distance. The minimum curve is 400 ft. radius (14½ deg.), and there are numerous curves of 500 ft. radius. All curves, however, are short. The maximum distance between stations is 3,600 ft., the minimum 822 ft. and the average 2,440 ft. It is anticipated that the consumption of fuel will be only 7 lbs. per train-mile, which is about one-fourth of that obtained on the London Underground and other similar lines in England. As, however, trains on the latter lines convey from five to seven times as many passengers as the Liverpool Electric road, there is not much difference in the amount burnt per passenger. The fares are 6 cents for first class and 4 cents for second class for any distance.

Reconstructing a Pittsburgh Bridge.

The reconstruction of the Ninth Street Bridge, Pittsburgh, Pa., was described by Mr. Gustave Kaufmann at the September meeting of the Engineers' Society of Western Pennsylvania.

* Illustrations and description of many features of this road appeared on pages 124, 125 and 126 of the issue of the *Railroad Gazette* for Feb. 17, 1893.

method of erection was as follows, taking one span at a time: The old sidewalks were cut off close to the trusses. The false work underneath the bridge was erected. The weight of the old floor was taken from the old trusses by blocking up the false work, which was done sufficiently high to permit the insertion of the new floor beams and stringers. The ends of the piers were first grouted and then cut down as far as was deemed safe. Tie rods were used between the two outer arch truss timbers to prevent them spreading when the pier ends were cut down, as they were, to a distance of 4 ft. below the bottom of the old skewbacks. They were rebuilt with large blocks of limestone set in Portland cement. The old skewbacks were not removed and the pier built up to a uniform section until the new trusses were erected, and the old timber entirely removed.

The stones were lowered from a small derrick situated in the centre of the roadway, through holes in the floor, there being enough room for masons to put the stones in their places. The erection of the trusses and placing of the top lateral bracing which was then done by a traveler. Intermediate floor beams and stringers, except those next to the piers, were then inserted under the old floor, and the weight of the old floor was transferred from the false work to the new floor system. The false work, except bents at piers necessary to support roadway at that point, was then removed and placed under the next adjoining span. When the roadway was thus fully supported, the old arch and timbers of the first span were taken down, the floor beams and stringers at the piers put in, and the remaining bents of false work removed. The brackets for the sidewalks were riveted to the outside of the posts, and suspenders were generally not put in position until nearly everything else had been done.

After two spans had been thus erected, an order came from the Government which necessitated the lifting of the channel span a distance of one foot. Granite blocks 12 in. high were placed under the shoes of the spans resting on the channel piers, and 7 in. blocks under the adjoining piers. The extreme ends were not lifted. The lifting was done by four 30-ton hydraulic jacks under each end post, one end being lifted at a time. The remaining spans were erected as originally intended and then lifted. The work was completed in less than one year.

Car Lighting in England.

The Midland Railway Co. of England is stripping five full trains of electric light apparatus and is applying Pintsch's light equipment in its stead.

Large Cutting Press.

The accompanying illustration shows a press for cutting out large armature discs, as recently built by E. W. Bliss & Co., 6 Adams street, Brooklyn, for the Edison General Electric Co., of Schenectady, N. Y. This press embodies a number of special features not hitherto used in presses of this class.

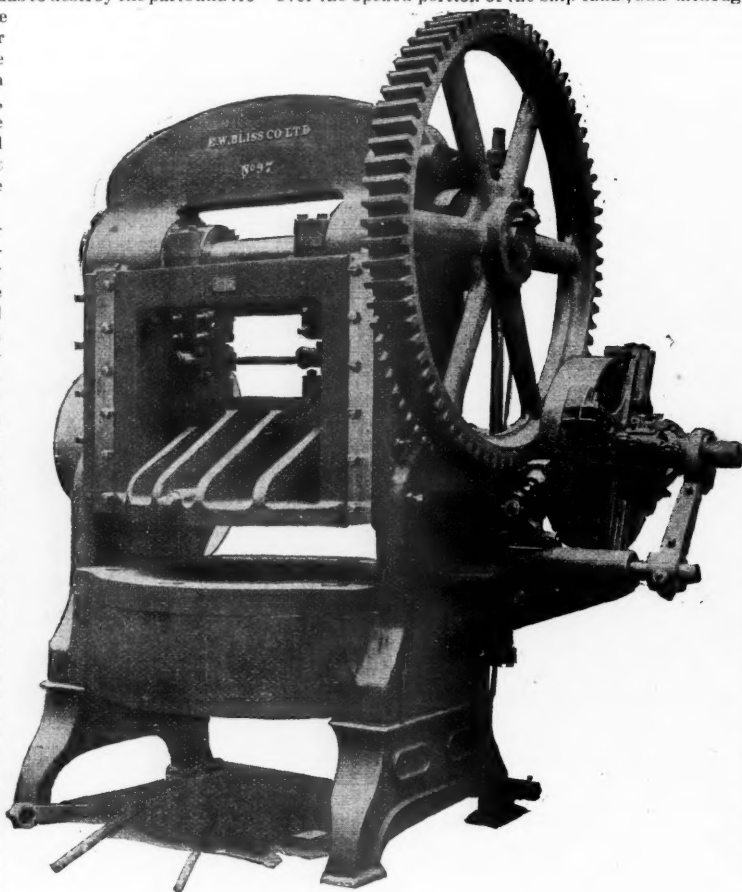
In order to give a firm support and accurate guidance to the large and delicate dies, the ordinary centre gib has been abandoned and the ways of the slide are spread apart so as to be as wide as the frame itself. This has also made it possible to lengthen the ways considerably, without increasing the height of the frame. The illustration shows the additional solidity and accuracy due to this mode of construction.

A new automatic friction clutch obviates entirely many of the difficulties experienced with the regular automatic clutches on heavy back geared presses. A pressure on the foot treadle shown releases the weight which actuates a powerful friction clutch on the back shaft, thus starting the press almost instantaneously and obviating entirely the heavy metallic blow which in the ordinary clutches tends to destroy the parts and frequently causes expensive delays and repairs. After the shaft has made one complete revolution a cam releases the friction clutch, bringing into action at the same time a brake, and thus stopping the slide at the highest point of the stroke.

The large gear wheel, instead of revolving continually, is, with these new clutches, keyed on the shaft, and at a standstill until the clutch is thrown into action. This constitutes an additional advantage in the saving of considerable wear on the shaft and wheel hub. Easy means of compensation are provided for whatever wear may be occasioned by continuous use.

This press will cut armature discs 30-in. diam. and larger. It has a distance between the housings of 54 in., and is generally made with a 30-in. round opening in bed, which, however, can be varied to suit special requirements. It is geared 1:10, and has a flywheel weighing 1,800 lbs. on the back shaft. The weight is 30,000 lbs.

The E. W. Bliss Co. also make a large variety of smaller presses of this class, many of which are now in use in nearly all the large electrical works.



Large Cutting Press.

Made by E. W. BLISS & Co., Brooklyn, N. Y.

The Manchester Ship Canal.

It appears that the matter of raising money to complete the Manchester ship canal is still beset with difficulties; £1,500,000 are still needed to open the canal for traffic to Manchester. This is assuming that it can be completed during the present year, and this amount may be increased by £305,000 by "certain deferred works." *Engineering* says that it is not desirable to determine now whether the experts made the Parliamentary estimates £10,000,000 when they should have been £15,000,000, or whether the mistakes have been made since. The point now is when the work can be done most expeditiously and most economically. It would appear that the chief difficulty now in raising the money is the attitude of the city of Manchester, which wishes to retain control of the directory. The bill now promoted by that city provides that the shareholders, who have subscribed £10,000,000, shall have eight representatives, and that Manchester, which has already loaned £3,000,000 and may increase its loan to whatever is necessary to complete the work, shall have fifteen, and that other towns which may make up a part of the deficit may have between them five representatives. The shareholders have brought in a bill asking authority to borrow £2,000,000, and in their bill propose that the board of directors shall consist of 21 members—the shareholders to elect 10, Manchester 8, Salford 2 and Oldham 1. Extracts from the report of the board of directors for the half-year ending Dec. 31, which was adopted Feb. 6, are given below:

The corporations of Manchester and Salford are applying to Parliament for power to purchase land belonging to the company for the erection of abattoirs and cattle lairages. In this connection it may be mentioned that a large party of the most important cattle owners was recently conducted over the canal, and the

arrangements for their trade explained to them. About nine-tenths of all the cattle imported into Liverpool finds its way into the manufacturing districts, and the proposed charges are much less than those at Liverpool. The dealers are at present engaged in a conflict with the Mersey Docks and Harbor Board, and there is a probability that much of the trade will eventually go to Manchester.

During the half-year satisfactory progress has been made with the general works, which are expected to be completed by the end of the present year; that portion of the work which was let by tender has been pushed on with much vigor, and there is every reason to believe that the contractors will finish the same within the specified time. The five deviation railways are now completed. The works on the Runcorn section have been carried on in a satisfactory manner, and although they could not be commenced as early as the other portions of the canal in consequence of the necessity of first making provision for the accommodation of the River Weaver traffic, it is anticipated that they will be completed concurrently with the remainder of the works during the present year. The floods of last autumn brought down into the canal a very large quantity of cinders, ashes and silt, and have thus augmented the quantity of material to be dealt with by dredging. Two large dredgers, which were provided for in the estimate of June last, are now being put together at the Salford docks and will shortly be ready for work.

During the half-year 700,997 tons of traffic were carried over the opened portion of the ship canal, and although

pools with an aggregate length of 198 miles. The first of these was completed in 1872, at Henry, and the second, at Copperas Creek, in 1877. The others are still incomplete. These pools would of course prevent any scouring of the channel, while the dams increased the flooding of the bottom lands in high water and added permanency to the marshes which covered about 10 per cent. of the bottom before the dams were built. The inhabitants of that part of Illinois have objected to this state of affairs, particularly since Mr. Cooley's project for turning sufficient water from Lake Michigan into the river to scour out the bars and afford a continuous, light draft navigation. These objections, which have prevented energetic dam building, found expression some four years ago in a series of resolutions by the Illinois Assembly requesting Senators and Congressmen to oppose further appropriations for the remaining locks and dams. Lately resolutions to the same effect have been submitted to the Illinois Legislature, with the request that a copy of the resolutions be forwarded by the Secretary of State to the Illinois Senators and Representatives in Congress.

A Driving Tire Record.

The Midvale Steel Company has issued the following circular letter to railroad officers:

"On April 20, 1882, Engine 35, tired with Midvale tires, went into service on the Cumberland Valley Railroad, and has made the following mileage record:

1882.....	33,954 miles
1883.....	57,594 "
1884.....	57,058 "
1885.....	57,930 "
1886.....	54,789 "
1887.....	55,654 "
1888 (to April).....	11,900 "

To first turning..... 328,969 "

From April, 1888, to Dec. 31, 1892..... 173,591 "

Total..... 592,560 "

"The tires on this engine have been turned but once and are still in use.

"Will you kindly compare this with the best records on your road, and favor us with particulars of any tires making as good or a better mileage than these tires have done? We have never heard of any figures approaching these."

Railroad Car Heating Methods Abroad.

A brief review of the several railroad car heating methods which have been tried and are in use on foreign roads is given in a recent issue of the *Journal des Mines*, and illustrates very strikingly the variety of the systems which have received the attention of railroad officials. The different systems provided, for instance, for the use of special artificial fuel apparatus, ordinary stoves, circulation of steam taken from the locomotive, as well as from separate heating boilers, hot water and hot air circulation, portable hot water boxes, etc., not to mention the numerous propositions which have been made for the generation of heat by friction apparatus operated by the motion of the trains the use of hot bricks to be heated at the stations before being put in the cars, the employment of the exhaust steam from the locomotive and of the waste products of combustion for heating water to be circulated through pipes in the cars, and others of a similar nature.

Briquettes.—Considering, first, the use of artificial fuels, or briquettes, the *Journal* points out that in Germany the apparatus employed consists essentially of a box placed underneath the car seats and containing either a drawer in which the fuel is carried, or an iron wire basket. The air supply necessary for combustion in this apparatus is secured in a variety of ways on the different lines on which the apparatus is used, but, in the main, the principle is the same. The briquettes are ignited before being put in the boxes, and are made up generally of a mixture of powdered charcoal, nitre, and some suitable binding material, dextrine for example. A mixture long used on the Berlin-Potsdam-Magdeburg line is composed of 82 parts of charcoal, 6 of ashes, 7 of water, 2 of binding matter, and 3 of nitrate of potash. This mixture, compressed and dried, yields a briquette which burns slowly and with a comparatively small air supply. The briquettes measure about 9 by 6 c. m. ($3\frac{1}{2} \times 2\frac{1}{2}$ in.) in section, and burn at the rate of about 80 gr. an hour. The price of the briquettes ranges from 320 to 350 francs (\$64 to \$70) a ton. As to the heating power of these briquettes, it is stated that one of them will heat about two cubic meters (about $35\frac{1}{2}$ cu. ft.) of space from 0 deg. to 15 deg. C. (32 to 59 deg. Fahr.). In practice, the number of briquettes supplied to a car compartment varies with the outside temperature; thus, with an outside temperature of 41 deg. Fahr. one briquette is used; at 32 deg., two briquettes; at 22 deg., three briquettes; and at 14 deg., four briquettes. The cost, as found on five German lines, amounts to from about 2 to 3.2 cents per hour per compartment.

In Norway somewhat similar briquettes are used, weighing about two pounds each and lasting for about six hours. They cost about \$76 a ton. In Belgium, Holland and England the briquette system has been abandoned, but in Austria-Hungary it is used much after the manner followed in Germany.

Stoves.—In Germany stoves burning charcoal, wood and coal are also used. Each car has one stove, so arranged that it can be supplied with fuel and receive all

The Illinois River Locks and Dams.

The Illinois River from Utica to Grafton, where it joins the Mississippi, has a length of 227 miles and a normal fall of 31 ft. This fall is greater when the Illinois is in flood and the Mississippi is low, and is less when the Mississippi is booming. The fall from Lake Michigan to Utica, 96.2 miles, is 141.8 ft., and several of the affluents of the Illinois have about as much fall. The area of the drainage basin is 27,914 sq. miles, of which 10,356 miles, or 42½ per cent., is tributary at Utica. The low water flow is about 500 cu. ft. per second in the upper part of the river and 1,200 cu. ft. for the lower section, and the normal flood volume from 45,000 to 50,000 cu. ft. per second. Most of the tributary streams bring down sand and gravel in high water. Under these circumstances the low water depths on bars, which governed the navigation of the river, was from 1.5 to 2.0 ft., the low water flow not having force and volume enough to clear its channel.

It was determined to try to remedy this state of affairs by building four dams with locks, viz., at Henry, Copperas Creek, La Grange and Kampsville, with heights varying from 6.25 to 7.83 ft., which should form four

necessary attendance from the outside of the car. In Austro-Hungary coal stoves are employed. In Russia the stoves, which are of castiron, have a sheetiron jacket and are, in some cases, charged from the roof of the cars, as on the South Constantin line. The number of stoves per car varies with the style and size of car. Wood or charcoal is used as fuel. In Switzerland, the stoves, where used, burn coke or wood.

Steam Heating.—The steam heating system, as used in Germany, provides for a main distributing steam pipe running underneath the cars. Each main pipe section is provided with blow-off valves, and the pipe on the last car of a train terminates in a suitable escape valve for the water of condensation from the whole system. From the pipes underneath the cars branches are led off to supply the heating pipes proper, which are arranged under the car seats. The temperature in the cars is under the control of the passengers by means of shut-off valves. Steam is taken either direct from the locomotive or from a special boiler placed in a car directly at the front end of the train. The latter arrangement is in use on the Bavarian state railroads. Where steam for the heating system is taken from the locomotive a reducing valve is employed.

In Austro-Hungary, on the Vienna-Warsaw line, steam for heating is supplied from the locomotive. In Galicia separate heating boilers are used. In Russia also separate heating boilers, of the vertical tubular type, are used. On short trains this boiler is placed at the back end of a train; on long trains it is placed about midway between the two ends.

In Sweden separate heating boilers are used on mixed trains, but on express trains the steam is taken from the locomotive.

Hot Air Heating.—In Austro-Hungary a hot air system is used in which a furnace is placed underneath the car, the air for heating being taken partly from without and partly from within the car. A certain amount of fresh, warm air is thus constantly introduced into the car, serving a good ventilating purpose. A mixture of coke and charcoal is used as fuel. Some German roads use a similar arrangement. In Switzerland, Belgium and Holland also, a modification of this system is in operation, and is apparently displacing the ordinary car stove, although, like this, it has the disadvantage of overheating the cars unless carefully attended to.

Hot Water Heating.—In Germany heating by hot water circulation has been used experimentally on several lines, but the most widely adopted method is that of the portable hot water foot-warmer. The latter is in use also in Austro-Hungary, Norway and Belgium, and particularly in England, where its use is almost universal.

Heating by Gas.—Gas heating has been tried principally in Belgium. Gas derived from the distillation of wood and oil is used, and is compressed to about 8 atmospheres pressure in suitable reservoirs. From these it passes through pressure reducers to burners in small heaters, the products of combustion being led off through small chimneys. The small heaters are kept at about the same temperatures as the portable hot water foot-warmers above mentioned.

Referring specially to the methods of car heating practised in France, the *Journal* says that while the large French railroad companies, in the main, adhere to the portable hot water foot-warmer method, extended experiments have been made with a hot air system, in which fresh air from the outside atmosphere is made to pass over furnace heating surfaces, and is discharged into the cars at the floor level. Thence it passes upward and finally escapes through the roof ventilators. The furnace is placed in a convenient corner of the car. One company used for several years a system of hot water bottles fixed to the floors at the feet of the passengers, and heated up, when cold, by injecting steam into them. This system however, was abandoned for some reason, although good results are said to have been obtained with it.

Practically all the prevailing methods of car heating, according to the *Journal*, have been experimented with more or less by the several French companies, and the result has been the conclusion to continue the present extended use of portable hot water foot-warmers. These, under the conditions of the French climate, are held to give all the comfort in railroad cars that can reasonably be asked for. But it is evident that no American system of steam heating from the locomotive has yet been introduced into France; not only are foot-warmers remarkably inefficient, but on a long journey they require such frequent renewal that the labor of removing and replacing them must be, even with the low wages paid in France, a very formidable item of expense. The Gold and other systems of continuous steam heating are being tried in Great Britain and are understood to give satisfaction.

The Slide Railroad.

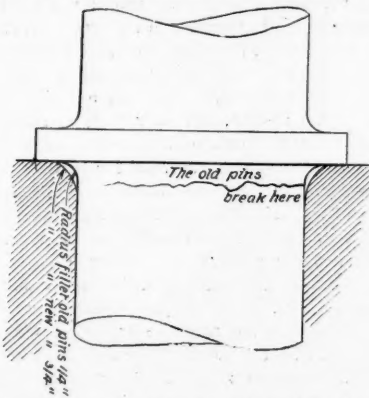
Messrs. Riter & Conly, of Pittsburgh, have shipped 170 accumulators for the Barre Sliding Railroad at Chicago, an adjunct of the World's Fair. The accumulators are 40 in. in diameter and 7 feet high, and tested to a hydraulic pressure of 325 lbs. to the square inch.

Riter & Conly have built for the new railroad bridge over the Missouri River at Omaha, Neb., a very large steel caisson.

Enlarged Fillets a Remedy for Broken Crank Pins.

The accompanying illustration shows the improved form of crank pin adopted on the Pittsburgh & Western. The alteration consists simply in enlarging the fillet at the shoulder of the axle at the wheel fit from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. radius. This has been found to prevent the frequent breakage of the pins at that point. The fact that the enlarged fillet and consequent more gradual change of section prevent breakages emphasizes what has been often stated in these columns on the subject.

Mr. W. J. Davis, the General Foreman at the Foxbury shops of the Pittsburgh & Western, makes it a practice to take out both main pins whenever one breaks. The apparently sound pin on being heated red hot is almost invariably found to be also cracked in the fillet. In November, 1892, six main pins were taken out, two being broken. All the remaining four were found cracked in the inner part of the fillet. These were all steel pins, put in by the Baldwin works about January, 1890, and



had therefore been in service about two years and eight months. Mr. Davis believes that crank pins should be removed and renewed every two years, but it seems highly probable that their life will be greatly prolonged by the use of the larger fillet, as shown in the sketch.

It will be seen from the illustration that, owing to the larger fillet, the new pins are $\frac{3}{4}$ in. larger diameter at the point where fracture usually occurs.

Washing Gravel Ballast.

In constructing the line from Laon to Liart of the Northern Railroad of France, the only material available for ballast was a gravel deposit containing about 130,000 cu. yds., a little more than sufficient for the whole work; situated very close to the line. It consisted, unluckily, of a mass of flinty gravel, so mixed with sand and rich clay as to form a moist and pasty conglomerate, a sort of natural concrete, in fact, in which clay replaced the lime or cement. To obtain clean gravel from this mass by screening was virtually impossible, and under ordinary processes of washing the clay sticking tenaciously to the pebbles formed into still larger masses, without removing any of the impurities. The system adopted by the company remedied all this, and the sharp pebbles distributed over the line had the appearance of being scrubbed and contained not the slightest trace of earth or sand.

The gravel is excavated by means of a Boulet No. 2 excavator and loaded upon trains of box cars of 2.6 cu. yds. capacity, so operated that there is a pretty constant discharge into the hoppers of the washers. These washers, of the Joncourt pattern, are four in number and work simultaneously. They stand on a platform about 16 ft. above the level of the tracks. Each washer is composed essentially of an inclined timber shaft 20 ft. 6 in. long, to which are attached for a distance of 16 ft. 6 in. twisted spoon-like paddles of steel arranged in the form of a helix. These paddles are bolted to the axis and easily removed and replaced. The diameter of the machine is 27.6 in. The axis is turned by an engine of 60 H. P., and the paddles revolve in an iron trough whose inner surface is 2 in. from the extremity of the paddles. The speed of the machine and its inclination to the horizontal are regulated by experiment. The trough is perforated with holes of 0.4 to 0.6 in. diameter, by means of which the water and sediment are carried away.

The machine in action receives the material at its lowest point and works it toward the top. The violent agitation in consequence of the helical motion removes all foreign matter from the gravel and the water delivered in great quantity from nozzles above the machine, and much agitated also, washes and cleans it completely, carrying away all the clay and sand as well as the pebbles of less than $\frac{1}{2}$ -in. diameter. The ballast is then loaded by means of an inclined plane on platform cars and distributed over the road.

The water is obtained from a neighboring stream, on the banks of which is situated the pump, operated by a portable engine of 30 H. P., which delivers 12,300 cu. ft. of water per hour, through a 13.8 in. pipe 1,050 ft. in length. The water is lifted a height of 42.5 ft. From the washers the water runs through an open conduit to a settling basin, whose area is 10 acres. It was made by enclosing the space with a turf-covered embankment. There are two other basins much smaller in extent, and the water is returned to the stream in as pure a condition as it was taken from it. Of the material delivered

in the hoppers at the washers 40 per cent. remains in these settling basins. Working continuously the 24 hours with the four washers an average amount of 850 cu. yds. of excellent ballast is daily supplied to the road.

The cost of this material prepared with such machinery depends to a great extent on the amount that is required. In the present case, where 130,000 cu. yds. are needed, all of which is obtainable in one spot, the cost per cu. yd. will be little, if any, above that paid under ordinary circumstances for good clean ballast. The process is fully described and illustrated in the *Revue Generale des Chemins de Fer* for January.

Cuban Ore Mines.

Three Bessemer ore properties in Cuba, near Santiago de Cuba, are now in the hands of American companies. They are: The Juragua Iron Company, working deposits 14 miles east of Santiago, shipping their ore at that port; the Spanish-American Iron Company, 19 miles east of Santiago, shipping by a railroad four miles long from an independent port; and the Sigua Iron Company, 26 miles east of Santiago, which also ships from an independent port by a railroad some seven miles long. The first-mentioned company has been organized some ten or more years and now ships about 400,000 tons per annum. The other two companies are just commencing to ship.

The Spanish-American Company's mines, etc., are described at some length in the *Iron Trade Review* by Mr. S. P. Ely, one of the directors, who says that the mines are in an almost continuous ore ledge of high grade Bessemer ores extending a distance of 3,500 ft., and are remarkably free from rock intrusions, or mixtures of any kind, "requiring less handling or sorting than any other ore of equal quality which I have ever seen." They are worked upon levels of from 200 to 700 feet vertical height above the railroad grade, to which the ore is sent down by gravity inclines and wire trams, discharged into storage pockets, and thence loaded into railroad cars in the Lake Superior fashion. The railroad is standard gauge, down-grade all the way to the sea and the cars used are the Duluth & Iron Range Railroad standard pattern 24-ton car.

The following analyses made by Messrs. Rattle and Nye are said to give a fair representation of ore quality and characteristics of the ore:

	No. 1. Per cent.	No. 2. Per cent.
(Dried at 212.)		
Iron.....	67.70	66.60
Silica.....	2.92	4.88
Phosphorus.....	.034	.045
Manganese.....	.034	.028
Alumina.....	.111	.181
Lime.....	.138	.110
Magnesia.....	.081	.092
Sulphur.....	.003	.008

The shipping harbor, Daiquiri Bay, is thoroughly sheltered on the north and on the east and southeast, and these points cover all of the winds that will make the harbor rough. The ore dock, 200 ft. long, is of iron and rests on iron cylinders 10 ft. in diameter, which are sunk by Anderson and Barr through some 20 ft. of sand and mud to rock bottom. It is 54 ft. high, having all of the latest and best Lake Superior improvements. Like the approach it is built by the Phoenix Bridge Company. The pockets will have 3,500 tons capacity, as they can be filled in a short time from the above mentioned storage pockets.

The ore docks are connected with the shore by two spans of dock bridge, 420 ft. in total length, which are also supported on cast iron cylinders. The track on this approach is curved, 9 deg. 30 min. radius. It is hoped to ship 1,000 tons a day.

Foreign Railroad Notes.

Work was begun two years ago on the Pacific end of the proposed Siberian Railroad at Vladivostok, this part of the line being called the Ussuri Railroad. Complaints have been made of the slow progress of this work, and last October the resident engineer was changed, an inspecting commission having reported that work had been begun here and there along 154 miles of line, but completed scarcely anywhere. Rails had been laid for eight miles. The force employed consisted of a detail of 3,000 soldiers and an equal number of convicts, besides a small number of Chinese and Koreans.

A bridge over the Polcevera, between Sampierdarena and Conegliano (not far from Genoa), had its foundations washed out, and the traffic over the line being very important, the Italian engineers made every effort to replace it by a temporary wooden structure at the earliest possible moment. The work was begun Oct. 12, and Oct. 31 the new bridge, 1,000 ft. long, was ready for trains, storms having prevented working on it five days out of the 20. This is considered a miracle of rapidity, and an officer of the Railroad Brigade of the German army has been commissioned to study the processes and apparatus employed.

Finland, the Scandinavian country northwest of St. Petersburg, whose constitutional monarch is the Czar, but which does not belong to the Russian Empire, has a state railroad system which includes ten different lines whose aggregate length is 1,106 miles, the longest line being 230 miles. The traffic is thin, the train service averaging in 1891 1.84 passenger trains and 1.15 freight trains each way daily over the whole system, and the traffic averaging 100 passengers and 93½ tons of freight each way daily (104 passengers and 567 tons freight here). The average train load was 54 passengers and 53 tons of freight, compared with 41 passengers and 175 tons in this country. The average number of passengers per passenger car was 7.81; of pounds per freight car, only 5,777. The line between the capital, Helsingfors, and St. Petersburg, 163½ miles, had nearly two-thirds of the whole passenger traffic and more than half of the freight traffic. The average earnings per mile on this line were \$5,935; on the rest of the system only \$1,242; on the whole system, \$2,623. The net earnings of the whole system were \$933 per mile.



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EDITORIAL ANNOUNCEMENTS

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The Illinois legislative committee which held several hearings concerning the collision at Wann, and whose absurd report we noticed last week, seems to have behaved in a manner even more outrageous and foolish than at first appeared. The General Manager of the road claims not only that the committee's views are warped, but that it misstates facts in the report, and has suppressed some evidence, even going so far as to choke off witnesses favorable to the road; and the General Manager's statement seems to be a fair one. The committee has presented to the legislature three bills whose provisions seem well designed to cap the climax of absurdity. One of the bills requires every railroad transporting oil to do so "on a separate track"; and another, prescribing regulations for employing men, says that they must be "between the ages of 15 and 50 years."

The death of Mr. Allen Manvel must be a matter of profound regret to the friends of the Atchison, Topeka & Santa Fé. What we think of the character of this powerful man is said in the notice in another column. It is probably true that his death was hastened, many years perhaps, by his absolute and unflinching devotion to duty. Military officers, particularly those of the United States and England, look on the development of this noble quality as the highest result of a military education. Men of other races find their greatest reward in glory, but the Anglo-Saxon officer finds it in the sense of duty done. But probably all of us fail to realize how many of the men around us in civil life are governed by the same lofty motive; and the most valuable result of a career like Mr. Manvel's is the inspiration given to younger men by such an example of heroic self-sacrifice. Naturally there is now much speculation as to his successor in the presidency of a system which embraces 9,328 miles of railroad and which is in such a position that it requires wise and resolute control. The men most often mentioned are Mr. Reinhart, Mr. Robinson and Mr. Wade, of the Atchison, and Mr. Jeffery, of the Denver & Rio Grande. Here is a choice of good timber certainly.

We publish in this issue some comparative tests of simple and compound locomotives made on the Cincinnati, New Orleans & Texas Pacific. As shown in table No. 1, the compound locomotive carried a maximum steam pressure of 185 lbs., whereas the simple carried only 145 lbs.; further, the compound had 16.3 per cent. more heating surface than the simple. The combined effect of these two differences, both of which favor the compound, was to increase its boiler efficiency 28.7 per cent. over the boiler of the simple engine, as is shown in table No. 2, in the amount of water evaporated per pound of coal. This would indicate only 6.7 per cent. saving due to the increased number of expansions in the compound, and this is the percentage that should be used in calculating what the saving would be were all the road engines compounded.

Incidentally there is some increase in the evaporation per pound of fuel in the compound, due to the lighter demand on the boiler for the same amount of work, and a further increase due to the more economical combustion obtained with the lighter draft, but the saving gained in the cylinders alone is the amount over and above that obtained in the boiler. One conclusion from these tests is that were the steam pressure of engine No. 531 increased to 185 lbs. and its heating surface increased 16.3 per cent. a much greater saving would be effected than by replacing the simple with compound cylinders. It is not our intention to convey the impression that this would always be true, but it evidently is in this instance.

The so-called "coupler bill" passed the House of Representatives last Monday after stubborn resistance. It was fought and filibustered against for several days, but the "friends of man" were resolute and good parliamentarians and succeeded in rushing it through under a suspension of the rules, and it was carried by a vote of 184 to 95. The bill thus passed is, as the reader undoubtedly remembers, the House bill amended and passed by the Senate, and now passed again in the House, so that it wants nothing now to make it a law but the President's signature, and that will undoubtedly be secured. The essential features of the bill were given in the *Railroad Gazette* of Feb 17, page 128, from which it will be seen that it is not merely a coupler bill but also an air-brake and grab-iron bill. The bill provides that in five years from the first of last January all engines, passenger and freight, engaged in interstate commerce must be equipped with power brakes and with the means of operating train brakes, and that enough cars must be equipped to enable the engineman to control the train. All cars must have automatic couplers within the same time, and within two years they must be provided with grab irons. The American Railway Association is also empowered to designate a standard height of drawbar. There has been no debate on the merits of this bill, but it has been treated as an *ad captandum* measure, having in it great possibilities as a vote getter, and, of course, the politicians of both parties have "tumbled over each other," as the saying is, to get for themselves whatever political advantage was to be had from the passage of the bill. It is a melancholy but not altogether unexpected result.

The automatic block signals for the Liverpool overhead railroad, which are described in another column, are of peculiar interest as being practically the first automatic railroad block signals in England. There were trials of automatic apparatus many years ago, but the Bard of Trade has been firmly opposed to the principle as embodied in the devices hitherto offered, and, as every one knows, substantially all of the railroads of Great Britain have been worked under the man-operated block system for a long time. The most radical difference between this system at Liverpool and the automatic systems familiar to railroad men in this country is in the arrangement for clearing the signal after a train has passed out of a block, by means of an apparatus on the last car of the train, instead of having it done by the locomotive. This recognizes an important principle in block signaling, and one which American railroad officers would do well to pay more attention to. The use of wire circuit signals affords important advantages not to be had with rail-circuit signals, but the latter have found the most favor, largely because the former do not satisfactorily provide against the danger liable to result from collisions caused by trains breaking in two. The operation of the clearing instrument by the last car meets this objection. It is true that a city passenger road, with cars all alike, can use this scheme better than the ordinary railroad can, but the ordinary road is not so badly hampered as is sometimes thought. If it were universal here to run baggage cars at the tail end of trains, as it is, practically, in England, it would be quite easy to adopt Mr. Timmis' plan with all regular trains, for the number of cabooses and baggage cars on any road is not great. And it would not greatly disturb anything but tradition to run baggage cars in that way. We are sorry to see the confused way in which the offices of a caution signal and of a stop signal are combined in the "starting" signal on the Liverpool road. It is not to be denied that the railroads of England have been worked with great safety under rules which require impossibilities; which call a signal a caution signal and yet require trains, running at full speed, to stop within 10 ft. after passing the signal if the track be found obstructed at that point; but this does not alter the fact that inconsistencies in the regulations encourage and even justify inconsistencies in practice, and these latter are what cause collisions.

The Reading Receivership.

The appointment of Mr. McLeod as one of the Receivers of the Reading has excited criticism, not to say disapproval, in many quarters. This criticism involves objections on the score of incompetency of Mr. McLeod to be a receiver, from a technical standpoint, as well as objections to the propriety of his appointment viewed simply as an exercise of judicial discretion.

We apprehend that no reasonable doubt can exist as to the power of the Pennsylvania Court to select one of the officers of the Reading as receiver where a case is presented justifying the appointment of any receiver. It ought to be well understood by this time that where a case is once made out, the personality of the receiver is left exclusively to the discretion of the Court; and to have that discretion reviewed by an Appellate Court it must be perfectly clear that it has been abused to the detriment of those interested in the subject of the receivership. Courts constantly invite, perhaps generally invite, nominations for the office by those most largely affected; and it is frequently the case that several names are submitted to the Court with the assurance that any one of them would be acceptable to the litigants. While the Court is by no means restricted to such nominations and frequently rejects them, yet it is doubtless generally true that where all the parties or substantially all the parties interested, with an honest purpose agree upon a person as suitable to be receiver and ask his appointment, it is rarely withheld.

There are of course certain fundamental principles which generally guide these appointments, looking to the faithful performance of duties and the accomplishment of the object of the suit in which a receivership is found to be necessary. Where the selection of any particular individual would frustrate, imperil or impede these purposes, his appointment should, in the exercise of a sound discretion, be refused. The application of these principles is sometimes difficult in practice, and often a grievous mistake is made by the Court where reliance is placed upon the agreement of the parties interested and immediately before the Court. Where the suit is collusively brought, a hasty application is inspired to enable one faction interested in a property to get an undue advantage over another, and where the Court is led into a hasty conclusion upon a hasty application, dissatisfaction and mischief are quite sure to follow.

We are not sufficiently informed in the Reading case of the circumstantial details of the suit to hazard an opinion on the question whether all those who were interested in, or most largely affected by a receivership, were consulted or even considered. No doubt a technical case was made out and appointments technically sufficient were made. But there are other aspects of the case to be considered besides strict legal requirements, and these other considerations embrace the fact that railroads have a public as well as private function, with duties to the State and to the bondholders and stockholders. Any selection of a receiver in a proceeding, however conducted, so far-reaching as the Reading case, which leaves out of view these larger considerations justly excites the suspicion that a blunder, if nothing worse, has been committed.

It cannot be disguised that the Reading has for the past six or twelve months filled the public eye to such extent as few roads have in the same time. Its combinations have not only excited the wonder and speculative impulses of Wall Street; they have awakened keen interest in commercial circles generally, and created concern even in domestic precincts, where such matters rarely penetrate. The public mind almost universally assumes the Reading combinations as the cause of the rise in the price of coal. This general interest had not flagged when from time to time rumors of greater achievements by the Reading were whispered around as in contemplation or actual accomplishment.

It was pointed out in these columns at the time the Reading leases were announced, that a careful investigation of available facts and figures discouraged the hope that the enterprise would be successful. Still it was undertaken, and many thoughtless persons joined the procession. Public interest was by no means favorable. Wise men looked askance at the meteoric brilliancy of these railroad maneuvers and shook their heads. Three states instituted proceedings to inquire into the validity of the Reading leases, and the first to pass upon the question pronounced the whole scheme illegal. Mr. McLeod was and is generally credited with concocting and consummating these combinations. Whatever talent and energy they evidenced stand rightfully to his credit. By an equal law, his shoulders were made to bear the burden of popular disapproval and the odium of a "jack-o-lantern" chase with vast in-

terests of many in his keeping. When the thing began to totter, and difficulties insuperable were in the way, it was announced a brilliant *coup* was in contemplation, and the next morning the Reading receivership was made public.

The appointment of Mr. McLeod was undoubtedly within the power of the Court, as a matter of law. But it has not been heretofore deemed sound judicial discretion, in the attempt to retrieve the errors of a road, to select the man who is commonly accounted as the author of its misfortunes. The swiftness of the proceedings bears a painful resemblance to an effort to forestall an application more meritorious. The suddenness of the announcement naturally follows from the secrecy of the application. As a *coup*, this proceeding may have been entitled to admiration. But *coups* sometimes in the world of railroad are economic and financial sins. And where they represent short cuts and snap judgments, even though they have judicial sanction, the property which has been subjected to such use suffers a setback in public estimation which economy and good finance have a right to resent. If enterprises perilous from a legal standpoint and hazardous from an economic one result in bankruptcy a premium should not be set upon them by rewarding the author of them with a judicial appointment of grave consequence to those whose interests are at stake. Beside the unfitness of such a procedure, in the nature of things, common prudence teaches us to avoid that which has reduced us to a strait. If it be said that the facts do not warrant conclusions so broad in the case under view, it is to be remembered that on the question of legality of the enterprise the matter is *res judicata*, and at the very moment of his appointment as Receiver Mr. McLeod was under the injunction of another court in the very course which made him a prominent and eventually a successful applicant for judicial favor. And beside this, the Reading, just emerging from reorganization, was entitled, it must be admitted, to a much longer relief from the harassment of litigation than it has enjoyed under its recent management.

Appointments of this character we must view as unwise. They tend to undermine confidence in judicial discretion, and, in reacting unfortunately upon railroad properties, prolong litigation and postpone good financial credit and assistance, without which few roads in a bad case can reach successful re establishment.

"A Defect in Railroad Organization."

We print on the first page of this issue the letter of a correspondent who calls attention to the fact that important questions in railroad management are often decided by a man who is not fully competent to decide them; by an officer who gives so much thought to one side of the question that he is liable to overlook important elements on the other, if, indeed, he is not incompetent to judge of both sides with entire fairness. The substance of our correspondent's remedy for this is that the managing officer who is high enough to have full authority over both the traffic and the transportation departments shall himself decide questions incident to getting traffic, lest the traffic manager accept prices which are too low, or the superintendent, in sequestering cars for the purpose of checking this tendency, go too far and cause the loss of profitable business.

As a theory this is all right, and we have printed the letter with the title put upon it by the author. The ideal organization would undoubtedly provide against the evil complained of, as far as organization can do it. But in practice we are not sure but the remedy which our correspondent refers to—that the officers of the conflicting departments be "sensible men"—is generally an adequate one. In many cases it is the only practicable one.

That word "sensible" means a great deal in this connection. The questions that have to be decided in the daily conduct of a railroad involve interests of such magnitude that it is hard to find men of experience, and the proper qualifications in other respects, who have the necessary judicial temperament. It is so hard to find them that, when they are found, the organization is often fitted to the men rather than the men to the organization. Titles do not mean anything in particular, nowadays. The Pennsylvania road has a vice-president who controls both traffic and transportation, and the Pennsylvania lines west of Pittsburgh are managed in the same way; but other large roads follow pretty nearly the same policy without changing their by-laws, or definitely assigning an officer. In many cases this course is followed because the resources of the company or the poor prospect of getting the right men seem to forbid an extensive

change in organization. Therefore the traffic manager is made a vice-president, not to have equal power over the transportation department, but with the idea that, being lifted above some of the petty details, his common sense will have freer play and his dealings with the transportation department will be increasingly harmonious. He really has almost equal power over both departments, but it is not formally defined. Or, if the transportation officer be the broader man of the two, he is made vice-president and his mind is expected to get rid of its prejudices.

On a growing road the question becomes one of promotion. Having decided that the traffic manager and the transportation manager (called General Manager) should have a man over them, which of them shall be promoted? One of them must have the place. The president is probably a financier rather than a railroader, but even if this were otherwise he cannot spend time to attend to the new duties. To go to another road is no better, viewing the matter from this point of one-sided qualification, than to promote within the home service, as the imported man would have had his experience in one department more than the other. One of the most impartial men we know of admits that his 25 years' experience in one department and his much shorter term in the other continually admonish him to test his decisions by the views of a man of the other kind of experience, before he issues them. The president cannot properly supervise by means of a "representative," as our correspondent suggests, for these questions are just the ones that the responsible officer does not like to delegate to some one else for decision. Assuming that both men are experienced and energetic the promotion probably falls to the one of the most judicial temperament. (We are speaking, of course, of roads where merit governs.)

One reason why American railroad officers regard anything like an umpireship as unnecessary, and therefore defer this question, is because if the department officers are well qualified men the umpire has little or nothing to do. We have heard of one road where the traffic and operating departments worked together so smoothly that the officer who supervised them both complained that he had no disputes to decide. Where a traffic officer gives improper orders direct to a division superintendent, or a superintendent bulldozes a traffic agent without the knowledge of the traffic chief, we should say that the defect was something worse than simple friction between the two departments; it is a case for better discipline within the departments. The first element of the remedy here is to bring all questions to headquarters for settlement. Again, most roads are so situated that the traffic manager has to spend most of his time fighting to get business at any price (within reason). The operating department must do the work as he wants it done, even if it be done at a loss.

And this brings us to the question, which of these departments should rule the other, where there is no impartial ruler over both, or where that ruler does not act. Undoubtedly it is, in most cases, the traffic department. As long as the law of supply and demand governs the commercial world, as long as the merchant dictates to the farmer instead of the farmer dictating to the merchant, the man who does the selling must have the most freedom in individual transactions. The maker of the goods can decide to make or not to make, only on general considerations and after reviewing the business for several months or longer. A farmer can control the price of corn only by restricting production next year. Like him, a railroad superintendent may often act wisely in submitting to the sale of his productions at less than cost temporarily; and the traffic man is presumably the better judge as to whether a loss now will tend to promote profitable business in the future. The superintendent's forte is, or should be, the promotion of efficiency and economy in those departments of the work where system is important. The traffic manager, on the other hand, must be expert in varying or suspending systematic work, and such suspension of regulations is what our correspondent's cited instances essentially consist of.

But the operating officer who thinks that it is giving too much power to a mere salesman to give the traffic manager the "casting vote" in conducting the everyday affairs of the business, may have the consolation of knowing that the logic of the situation throws the next promotion to his side of the house. Like the celebrated mechanical problem, which had innumerable elements of security, but finally depended upon one split key, the problems of running a railroad finally come to one head, and that headship—the presidency—can be filled by the operating manager better than by the traffic manager, for the same reason that the man who makes a watch or a locomotive is a better

judge of it and its capacities, as a whole, and in the long run, than the man who has given his life to dickering about the price at which watches or engines should be sold. One of the "bottom facts" of railroad management is that the man who controls the ownership of a road is generally going to fill the presidency or chairmanship himself, whether he be a lawyer, a farmer, a poet, or nothing but a speculator; but when he wants a railroad man for the place he is likely to decide as we have indicated. If the general manager finds himself left behind and the traffic manager advanced he must attribute it to differences in native talent.

Strikes or No Strikes.

II.

In considering the question how strikes may best be avoided, it must be first taken into account that the relations between labor organizations and managers of corporations are now generally approximately such as exist between barbarous adjacent tribes, each party being ready for a foray upon the other whenever any convenient opportunity presents. If there is a falling off in rates, or in amount of traffic, the railroad manager must reduce expenses; and possibly the readiest and most proper course to be taken is to cut something off from the price paid to labor. Now, although this may be the right and only course open to the manager, the question of wages is one in which the employé has a natural and indefeasible right to be bargained with, and to agree upon terms and conditions with the employer.

The concentration of power in the hands of an individual has often led to the assumption of a tyrannical or dictatorial position by railroad managers (which for a long time was acceded to by employés because they had found no remedy), and the managers have maintained the custom of fixing the wages of any class or of all classes of men by edict, without the slightest attention to the rights or wishes or opinions of the men. This arbitrary action by managers has been one of the causes, and perhaps the principal one, why the men have been compelled to organize for self-defense. Obviously, the single employé could utter no effectual protest; "take what I offer or let it alone" is the answer which the manager can and will make to an individual—so that the Howards, "who know their rights, and knowing dare maintain," have been and are now striving to unite as many men as they can, in order to offer the more imposing resistance to such action.

Any large number of men joined together for combined action will select a leader or leaders, upon whose judgment and character will depend the kind of action taken by the combination. There will be among these some bold spirits, to whom it would afford supreme satisfaction to get even with the managers, and to go further than simply to protest against an arbitrary reduction of wages, and to originate on their part a demand for an increase of them instead. If this combination is large enough, and has accumulated some funds in preparation for a conflict, and if its leaders are popular with the members as well as determined and energetic, the result of a strike is likely to be severely felt by the manager who is selected for the object of attack. He may, indeed, successfully resist a strike; it may be his duty to fight the organization to the last extremity; in the present state of barbarism, and with the forces of labor combined expressly for battle, it might be cowardly not to defend his position and authority by every means, even to the exhaustion of both sides. But this termination of the conflict, or any conclusion of it except by compromise will determine nothing. The right of the freeman to an equal part in fixing the price he shall receive for his labor will continue to be reasserted by every form of violence until it shall be reestablished, because it is right.

What would happen if the railroad managers were to accept this result as already attained, and so avoid a part of the conflict and losses which are imminent? How would it be with the manager himself (for he is a wage-worker too, in most cases) if he were to receive a printed notice that on and after a near date (named) his rate of pay would be 10 or 20 per cent. less than heretofore? Or would he prefer to receive a letter from the chairman of the board showing the difficult circumstances of the company, and inviting him to confer with the board upon a general reduction of officers' salaries? It is on record that in some instances where the first plan was adopted the general managers got mad; and in others, where the second course was followed, they volunteered to accept a reduction. And, since railroad employés are also men, like the managers, they have been known to acquiesce cheerfully and readily in a reduction upon which they had been conferred with in advance.

Let us suppose a case; we will conjecture that there may be a line of road upon which there is known to be a ferment of dissatisfaction among the men, and that it has taken on form enough so that there have been selected certain leaders, committeemen, or whatever, who can be conferred with; or if the leaders have not been appointed, the natural leaders must be known to the officers of the road. Suppose the general manager or the general superintendent were to send for some of these leaders and say: It is understood that some of our men are dissatisfied, we do not like such a state of things; we want everything to be harmonious on this road,

Now let us appoint a committee of conciliation, of which I will appoint half and the men the other half, and let this committee consider any grievances and report to me and to the men what they find is not right and how it can best be remedied; and we will have this committee meet once a week until we find they have nothing to discuss, and later, upon call, if necessary. Judging from the experience of 26 years in England, which we referred to last week, these meetings could not be less than conciliatory in effect, and from the known reasonableness of Americans, when met half-way, we believe that good feeling and harmony might be secured. There is, indeed, one unfailing virtue which adorns the human character whenever it is not repressed by passion, that is magnanimity; and some of the finest instances of its exhibition have been by the "laboring classes." It may safely be relied upon to keep down any unjust demands of the selfish or mean in such a conference.

It may be pointed out that the manager, who authorizes this committee of conciliation, still retains the power of veto, which he will probably never be called upon to exercise, but which may at least serve to reconcile his board of directors, perhaps even himself, to what will at first seem to many "men of the old school" a humiliating deference to circumstances.

It is probable that the proceedings of such a committee as we have supposed, will reveal to the manager a multitude of petty troubles, oppressions, needless traditional regulations, once useful now hurtful, which he will be surprised at and be glad to remedy. The men go on for years grumbling to each other about these and wondering at the managers who retain such customs or rules, yet do not communicate with authority about them, for they seldom approach the throne except upon grave matters and about afflictions which cannot be endured; meanwhile the manager, borne down by great affairs, has had no suspicion of these causes for discontent which he will find by his committee to have been for a long time an annoyance to his men.

It is common to hear much objection made to "grievance committees," and it is thought that they must stimulate the men to be continually complaining and imagining themselves ill treated. This name is certainly badly chosen, and such a committee undoubtedly does call out the full force of the grumblers; yet the value of even a grievance committee as a safety valve cannot be overstated. Among the first to be tired and ashamed of trifling complaints are the members of such a committee. A grievance committee may be for a while an uncomfortable appendage, yet very far from an unmixed evil for a manager who has tact, and an honest regard for the rights of others.

The position of affairs at the present time amounts to just this: The men are considerably organized for a trial of strength; there are leaders among them who are quite ready for the fray and who have nothing to lose by a struggle, even if unsuccessful; they gain notoriety, double wages and expenses paid, by promoting discord. The chief reason which existed for forming these associations was the necessity of defense against the arbitrary acts of managers. This reason can be eliminated from the discussion at once by conciliatory, just action on the part of managers. If a great change in this respect does not take place, there is every reason to expect that the organizations will take up an advanced position as unreasonable as that of the managers has been, and declare that they alone will say what wages shall be. Neither party can afford to enter upon the conflict necessary to settle this matter in the usual way of strikes and lockouts. Either party can better afford conciliation.

Proposed Railroad Legislation.

The bill to increase the liability of employers in cases where employes suffer personal injury, which has been under discussion in several states, seems to be going the rounds. In Arkansas a bill of this kind has been passed and sent to the Governor. In Illinois there is a proposition to limit the extra fare that can be collected of passengers who do not buy tickets. There is also a bill providing for the election of the railroad and warehouse commissioners by the people, which seems to have favorable prospects. The lower House of the Indiana Legislature has passed a bill to make unlawful the insurance association of the employes of the Pennsylvania system. The Indiana House has also passed a bill to tax sleeping cars. In Kansas the maximum freight rate bill has been passed by the Populist House by a vote of 68 to 0. It contains a provision dividing the state into three districts with three commissioners in each district. Conser vative Massachusetts is considering a bill compelling the railroads to carry state officers free. The Michigan Legislature has an employers' liability law, and Minnesota is discussing the question of having railroad commissioners elected by popular vote. There is also a bill at St. Paul requiring all trains to stop at county seats. This is said to have been got up for the benefit of one particular town.

Missouri has nothing new this week, but we are pained to learn that a proposed law regulating stockyards is finding a thorny path. Mrs. Drabelle, the wife of one of the assemblymen, is so enthusiastically interested in the

defeat of the bill that the manager of one of the stockyards has had to send her "a magnificent bouquet."

A member of the Nebraska Legislature has offered a resolution to memorialize Congress to make the Union Pacific settle up its debt to the government right off. The New York Legislature, which tried to regulate the hours, and incidentally the pay, of trainmen a year or two ago, but which passed such a shabby law that the courts at once tore it to pieces, has now got the matter fixed all right. The Assembly has passed a bill making it unlawful to work any man more than 10 hours a day. The only fault we have to find with this law is that it does not apply to all of us. The New York Legislature has been discussing a freight car coupler bill. In Ohio the lower House passed a bill allowing the railroad commissioner to compel the use of electric bells at highway crossings, but the Senate sat down upon it. Mr. Crill, of South Dakota, has presented a bill making three cents a mile the maximum rate for passengers. The bill to kill off the ticket scalpers has appeared in the State of Washington. The similar bill heretofore reported in Montana appears to have been passed. Evidently some one or more of the trans-continental roads have got these bills presented in the several states; but, if we may judge by the length of the arguments in the local papers, the scalpers have a good deal of "influence with the press" out that way.

The West Virginia Legislature has dropped the proposed bill to require separate cars for negroes, and the Wyoming Senate has rejected the bill to establish a State Railroad Commission. "Union Pacific influence killed it," so the papers say.

The Cleveland Car Service Association, of which Mr. A. M. Simmons is manager, has adopted one of the most interesting changes in the method of collecting demurrage that has been tried since the movement began six years ago. It is the very sensible plan of giving large consignees credit for promptness in unloading by reducing their monthly bills when they unload a majority of their cars in quick time. The scheme is called the 24-hour average basis, and has been in force, with much satisfaction, for six months. If a consignee unloading 1,000 cars a month detains them on an average only 24 hours each, he pays nothing, even though individual cars were detained beyond the free-time limit. Mr. Simmons issued a circular illustrating the scheme thus: a party receiving 1,000 cars pays \$100 demurrage for a month, the charges having been entered according to the ordinary rules. The detention on all his cars is then computed and found to be, say, 25,000 hours. Of this 24,000 is deducted, leaving 1,000 to be paid for. This 1,000 is then divided by 24 hours, making 41 2/3 days, which at \$1 a day equals \$41.66; this is the amount to be paid, and \$58.34 is refunded. This arrangement is made only with customers signing a contract, which reads in substance as follows:

We hereby notify you that we desire to accept the conditions of Circular No. 17 and be governed by the 24-hour average regulation. . . . We agree to use due diligence in loading and unloading cars, to the end that our detention may be kept within the 24-hour average limit and that no individual car shall carelessly stand under lading after offer of delivery to us, nor will we permit empty cars to stand an unreasonable time after placing to be loaded. We further agree to give 10 days' written notice to the Manager previous to the expiration of the month, should we desire to discontinue the arrangement.

The Cleveland Association, it will be remembered, allows 96 hours' free time on coal and coke. The statement of the association for January shows that of the 31,448 cars handled at the 50 stations in the territory of the association 15,674, or about one-half, were handled on the 96-hour basis. The average detention of coal and coke was 2.29 days per car. The average detention of cars handled on the 48-hour basis was 1.31 days. The foregoing covers all the cars handled, including the 9,576 cars handled on the "24-hour average." On these the average detention was 1.40 days. The percentage of cars released in 48 hours was 71, and the percentage released in free time, which includes both the 48-hour and the 96-hour classes, was 83.

The committee appointed by the American Society of Mechanical Engineers to report on a standard method of testing locomotives met at Purdue University, La Fayette, Ind., on Thursday, Feb. 23. Prof. W. F. M. Goss, of the University and member of the committee, has devised a very important piece of apparatus for making shop tests of locomotives, and one which is looked upon with great interest by all mechanical engineers. This apparatus was in operation, and a test was run for the committee. Many have read the description of this apparatus as it was given in the Proceedings of the American Society of Mechanical Engineers last year and at considerable length in the *Railroad Gazette*; but an appreciation of the ingenuity and courage necessary to devise and construct the machinery is not to be had from a written description. The whole arrangement is very impressive, and much credit is due to Professor Goss for this piece of work. During the test made for the committee the whole apparatus worked with absolute perfection. None of the bearings heated, the brakes absorbed the power without heating, and it was evident that the brakes have a capacity of something over 800 H. P., perhaps 1,000 H. P. The engine is supplied with all of the modern apparatus for measuring the water, coal, horse power, smokebox vacuum and

temperature, dryness of the steam, drawbar pull, oscillation of the engine due to counterbalances, and mechanical work performed on the drawbar. The apparatus is in the engine laboratory, which is large and contains several stationary engines and dynamos. Altogether, the outfit must help to make Purdue University attractive to young men. This is true not only of the strictly mechanical engineering department, but also of the manual training, electrical, and other departments. Much new apparatus has been purchased recently, and the entire equipment is modern. The school being away from a large city, the young men are rather confined to a student's life, and therefore more recitation hours are given them, the object being to reduce the number of hours required for preparation for study and to increase the direct instruction given them by the teachers in the class room.

The Chicago city council has passed an ordinance compelling the elevation of all railroad tracks in the city (except the Illinois Central lines on the lake front) and Mayor Washburne has approved it. It divides the city into three districts; the first includes the "down town" section of the city and affects only those roads entering the Van Buren street station of the Lake Shore and Rock Island roads, and the Dearborn station on Polk street. The second district covers all terminals except that of the Illinois Central, which is exempted north of Fifty-first street, and includes the greater part of the complicated crossings of the city. The third district includes the outlying territory. The ordinance provides that all tracks on the surface of streets within the first district shall be removed on or before Jan. 1, 1895. The same conditions apply to the second and third districts except that the date is Jan. 1, 1897, for the second district, and Jan. 1, 1899, in the third. The ordinance is a long one and requires that the tracks must be on metal structures, the columns not to be over 24 in. wide; that the floors shall be solid; that the structure shall give 13 ft. head room for teams; that no elevated railroad shall be built lengthwise of a street; that the motive power must be noiseless and smokeless; that the work shall be begun in the first district July 1 next; and that failure to comply with the ordinance shall be punished by a fine of \$200 for each offense; and every running of a train at grade after the prescribed date is to be a separate offense.

As every one knows, the railroad tracks of Chicago can be raised, in the way here proposed, only by the expenditure of many millions of dollars, and this ordinance, entirely ignoring this vital point, was passed with little or no discussion. No one pretends to offer any legitimate reason why it should be passed at this time, and probably none exists. It is hardly to be expected that the ordinance will have any effect, but we notice that a bill has already been presented in the state legislature at Springfield permitting the railroads to remove their terminal stations to the outer portions of the city; in other words to abolish their tracks rather than elevate them.

The strike of switch tenders on the Chicago & Western Indiana at Chicago on the evening of Feb. 22 made but little disturbance. It included towermen, operating switches and crossing gates, and there were some 60 or 70 men altogether. Trains were considerably delayed for a day or two, but new men were readily obtained. It appears that the men had appointed a committee, and that there had been some negotiation about increased pay, but the committee seems to have been unable to control its constituency, and the strike was started in violation of an agreement made by the committee stipulating the time for a further conference. The press reporters who had been predicting a general strike of switchmen (yard trainmen) hailed this outbreak with evident glee as the fulfillment of their predictions, but it does not appear that any other railroad employes sympathized with the switch tenders. Some yardmen at Topeka presented a demand for higher pay last week, and some engineers on the Chicago, Burlington & Quincy made a similar request, which it is said was granted; these and other items of comparatively small consequence were published in connection with the Chicago reports, but it is impossible to find in these reports any real indication that a general strike is impending, except in the "scare" head lines put on in the newspaper offices. The engineers and firemen of the Louisville & Nashville have been asking for higher pay, and certain trainmen of the New York, Pennsylvania & Ohio have also had conferences of the same kind, but in both of these cases the matter seems to have been amicably settled without any marked changes in wages.

The people of Baltimore, Hagerstown and other places on the Western Maryland railroad are exercised over the likelihood that the special appropriation for a fast mail over this road will be omitted from the budget of the post office department for the coming year. This appropriation, giving extra compensation for fast time on an early morning train when passengers do not wish to travel, was first established when such special compensation was paid to a considerable number of railroads; but one by one the principal roads have been induced to carry the fast mails at the ordinary rates, and the

Hagerstown route is, we believe, the only one on which the high rate is still in force. A report issued in 1892 showed only this and the Atlantic Coast Line as recipients of the special pay. It would be a matter for regret if this fast mail should have to be taken off, but as the postal laws now stand the recommendation of the post office department to stop the extra pay is undoubtedly just. The post-office department is necessarily run on arbitrary lines and exceptions to the rules are justifiable only when they can be equitably applied. This is not the case here, for a hundred other routes deserve extra pay as much as this one, and it is out of the question of favor all of them.

One of the exhibits now preparing for the World's Fair, which should be of particular interest to railroad men from abroad, is a duplicate of locomotive No. 385 of the Central Railroad of New Jersey. This is being built for that company by the Baldwin Locomotive Works. No. 385, it will be remembered, is a Vaucain compound. The cylinders are 13 and 22 x 24 in., the drivers 78 in. and the engine weighs in all 123,800 lbs. with 88,400 lbs. on the drivers. What makes this engine especially interesting is the fact that it has made 97.3 miles an hour for one mile with a train. This is the fastest time on record, except a record of 4.1 miles in 2½ minutes, said to have been made on the Reading in 1890, but which was not published until two years after, and therefore was received with some little incredulity.

The progress of railroad legislation in Texas seems to have been summarily checked, and a Galveston paper says that probably none of the bills will be passed. A variety of projects had been presented, with the expectation that last summer's decision of Judge McCormick, in the United States court, enjoining the Railroad Commissioners from further interfering with rates, would be reversed or modified at the present session of the court. But Judge Maxey has disagreed with Judge McCormick about the mode of procedure, and it is said that the present status of the matter will not be changed until the suit can go before the United States Supreme Court, which will be months in the future. This being the case the Texas lawmakers are very much discouraged.

NEW PUBLICATIONS.

Abstract of Arbitration Committee's Decisions.—This condensation of the decisions of the Arbitration Committee of the Master Car-Builders' Association has been recently noticed in these columns. The author, Mr. J. D. McAlpine, of Cleveland, O., now announces a new edition, to which he has added a table of synonyms and a list of words often misspelled on defect cards. Both these lists are arranged alphabetically. The former gives, for instance, "drawbar, drawhead, pull iron, shackle bar, bull nose" together, and the author's suggestion is that the first name of each group be uniformly used and made the standard. The list of names of parts, based on the Master Car-Builders' Dictionary, is a gentle hint to inspectors not to send for hydraulic jacks to raise dymond trucks under cattle cars, and not to expect the clerks to keep their faces straight when they receive a report that break sillinders need cleaning. Probably this is a good idea, but for ourselves we feel like objecting. The shop clerk's life has none too much of lightness to vary its monotony, and Mr. McAlpine is working to kill off one of the few sources of lightness left.

Mr. McAlpine is also circulating a defect card in which are shown certain improvements which he proposes. These may be best described by the following extract from his circular:

The margin is divided into squares for the purpose of allowing inspectors to write in their marks and date the first time they take record of the card, so that if the car with that card should pass their station several times (as is often the case) it would only be necessary to take record of their marks and date each time, instead of the defects in full that are noted on the card. The card also has names of defects that are most common printed on back of card and stub, so that instead of having to write such defects in full two or three times in addition to writing them in full on the face of the card, it would only be necessary to check off the printed defect on the back after writing it in full on the face of card. It would not cost any more to print such cards, and, besides insuring uniformity in naming the defects, it would cause the defects to be given more exactly, so that instead of cards reading "Wrong draw bars," the kind of draw bars in the car and the kind that are standard to the car would have to be shown. It is believed that the use of such cards would benefit the service by insuring more prompt interchange of cars, as less time would be required in carding and taking record of cars.

Proceedings of the Twenty-first Meeting of the American Society of Railroad Superintendents. This pamphlet (for the meeting held in October last) has just been issued by the Secretary, Mr. C. A. Hammond, of Boston. Not much was done at that meeting except to discuss the catechism which the Transportation Committee had made, for use with the standard code; but the pamphlet contains the catechism in full, and is notable as an example of very thorough and painstaking work on the part of the Secretary. The book contains a fine portrait of the late President of the society, H. Stanley Goodwin. The appendix contains the replies of members to the Secretary's inquiry about their experience with the standard code of train rules.

These replies were not read at the meeting, and we have made a notice of them in another column of this paper.

The Practical Engineer's Pocketbook and Diary. Edited by W. H. Fowler. Second edition. London: Technical Publishing Company, Ltd., 1893. Price, 1s. 6d.

This is a book of tables, rules and formulæ designed to be useful to engineers, draftsmen, boiler makers, machinists and steam users. The text fills 190 small pages, and there is what seems to be a pretty copious index. In addition to this there are several pages, dated, for daily memoranda.

Manual of Statistics and Stock Exchange Hand-Book. New York: Nicoll & Roy Company, 16 Dey street. Price, \$3.

This is a hand-book designed to give statistical information concerning railroads and street railroads. Certain information is also given of banks, the courses of stocks and other securities on the various exchanges and concerning mining, cotton, coal, etc. The volume being quite small, only 454 pages, is convenient for use.

TRADE CATALOGUES.

The Hilles and Jones Company, of Wilmington Del., have just issued a very handsome catalogue illustrating the numerous sizes and forms of their specialties, punching and shearing machine, plate bending and plate straightening machines, milling machines, four spindle, wall and radial drills, etc. The book is well illustrated and the descriptions and references, etc., are clear and appear to be very complete. The volume will be found especially useful to all those engaged in the manufacture of locomotives, boilers, tanks, ships, ships' masts and yards and others, as it contains a great variety of machines for special work.

The Mills' System of Railway Gates. Bogue & Mills Manufacturing Company, 218 La Salle street, Chicago, Ill.

A little pamphlet issued by this company contains illustrations of various styles of the well known Mills gate and price lists of gates complete and of parts. A novelty which is shown is a gate made of gas pipe to be used where the span is very long. This pipe gate has no underground connections and is light and slightly in appearance, and is adapted to any probable span required.

Mr. Chas. L. Heisler, M. E., Philadelphia, Pa., has just issued a small pamphlet giving particulars of the form of geared locomotive he has recently patented. Several styles of this type of engine are shown, the weights varying from 8 to 60 tons. The larger sizes have twelve drivers and the smaller eight, all arranged in four wheeled swivelling trucks and driven by a single pair of cylinders.* The bevel gear wheels used run in a bath of oil.

The Long Distance Transmission of Electrical Energy.

The world is indebted to Mr. Chas. F. Scott, who, at the last general meeting of the American Institute of Electrical Engineers, held last June in Chicago, minutely described two plants, one for lighting and one for the development of mechanical power, which bear the stamp of commercial success, and who has thus put us in the possession of many useful facts. Both plants are operated under conditions which include considerable distance of transmission, extreme difficulties of climate and roughness of country, exacting requirements in continuity of service, and a pressure above that ordinarily used in the class of machines employed.

The lighting plant is that of the Willamette Falls Electric Co. of Portland, Or. Portland has not the great advantage of proximity to developed coal fields, but in the falls of the Willamette River at Oregon City, 13 miles distant, estimated at from 200,000 to 250,000 H. P., has in abundance another supply of energy, to avail itself of which electrical transmission is admirably adapted. The present station is located on an island in the middle of the river. Victor wheels of 300 H. P. operate each, two alternating current dynamos for incandescent lighting of Westinghouse make. The current at a pressure of 4,000 volts is received in the Portland sub-station at 3,300 volts, where it is reduced to 1,100 volts for distribution, by transformers, which work by induction, and is further reduced in the various circuits to the required voltage of 50-100 volts.

Up to the time of the designing of the plant it was not considered practical to generate such high potentials as the requirements here demanded, with the ordinary type of machine. The work was undertaken, therefore, with a new type of armature which has rendered high potentials possible in machines of simple construction.

This whole plant is almost ideally simple. Mechanical is converted into electrical energy, which is transmitted by a simple conductor over a distance much too great for any other agent, and transformed to a pressure suitable for incandescent lighting. And yet in this whole system we have but one mechanical form of motion, the simple one of revolution. The only wear and friction is in the dynamo, whose bearings are large and easily lubricated. The line does not deteriorate, and the transformers are entirely simple in their construction, and have never given any trouble or cost a cent for repairs.

* A small engine of this type was illustrated in the *Railroad Gazette* Nov. 25, 1892.

The plant was first installed about two years and a half ago. Starting with two they have now seven incandescent machines, each with a capacity for supplying 1,250 16 C. P. lights in Portland. With the exception of one slight mishap due to accidental short circuiting the dynamos have run admirably. The line has given very little trouble.

The power plant described is situated near Telluride, Col., and owes its installation also to the difficulty of obtaining and the cost of fuel, and the character of the country which prevents the direct use of neighboring hydraulic power. The conditions here are of the most favorable character for demonstrating the value and possibility of electrical transmission. The power generated operates the crushers and stamps of the Gold King Mill.

In this plant a Pelton wheel receiving water through a 2-ft. pipe under a head of 320 ft. drives the dynamo. The current is carried over a line of bare wire to the mill, nearly three miles distant, and drives a synchronous motor of 100 H. P. Both dynamo and motor are alternating current machines of the same size and form as the dynamos in Portland. The chief advantages in using a synchronous motor, and which are of great value in the operation of the system, are the excellent current regulation with different loads, the tendency of the machines to normal adjustment with the ordinary variation in the field currents, the small liability to injury when the motor is greatly overloaded, the high efficiency, and the ease of attendance.

The plant has been in operation since June 1891 and a careful record kept for over nine months shows an aggregate loss of time on account of the electrical apparatus of less than 48 hours in a constant working of 6½ days a week. No serious accidents occurred. The plant is being much extended and a new 750-H. P. generator has been ordered, of a type which has three times the capacity of any alternating current dynamo previously made in this country.

Mr. Scott says that the future of long distance electrical transmission lies in the use of alternating current machines worked on the synchronous or multiphase systems. The latter is held by many to possess for this purpose as many advantages over the synchronous system as the alternating current possesses over the direct. The alternating current machine is simple in construction and operation, and simplicity is a prime requisite in electrical power transmission or distribution. In direct current machines the commutator is the characteristic feature. It is expensive to make, maintain and renew and is ordinarily the source of more trouble than all other causes combined. It is, moreover, the principal element which limits the electromotive force at which the machine may be operated, and in order to obtain a high potential, systems are planned in which generator and motor is each composed of three or four distinct machines to be run in series, in order that an excessive electromotive force may be avoided on any single commutator at the expense of many machines and multiplied parts. Thus the alternating current machine in supplying a voltage that with the commutator is impracticable readily meets conditions that limit direct current apparatus.

Pressures (say about 4,000 volts), practically the same as those employed in the plants above described, are ample for considerable distances, say about 10 miles. The extension to greater distances is largely a question of increased voltage and is provided for by the use of larger machines. For distances where a pressure over 5,000 volts is required good practice indicates the use of transformers for raising the pressure at the generator and reducing it at the motor similar in general to those used at Portland. As the cost of copper decreases rapidly as the voltage is increased, the reduction in this case must be more than sufficient to cover the cost of the transformers.

Mr. Scott's paper is printed in full in the July-August, 1892, number of the "Transactions of the American Institute of Electrical Engineers."

The Adventures of a Way-Bill:

The other way-bills with which I am now filed have had much less varied experiences than I, specially those which were made out at larger stations, where everything is done by routine and there are clerks assigned to every imaginable duty. But at Smithville station, where I began my existence as a way-bill, it was different. I did not have a chance to notice much as I reposed at the bottom of a drawer in the agent's table, but when at last the tablet in which I was bound was taken out of the drawer, I began to realize that the agent was a good deal more than an agent of the railroad company, inasmuch as he managed the express and telegraph business and various other affairs of his own. As my brother way-bills were gradually filled out and torn off, I became more and more acquainted with the business of the office, and could distinguish the voices of the engineers as they ran in for orders or to ask for the time of the trains which were following them, the voices of the track men as they dropped in to warm up after a long battle with the snow, and of the country people who came in to take or meet a train.

At last the way-bill next to me was torn off, and I had a chance to see the little office in which I had lived so long, with its gay advertising prints and photographs,

many of the year before last, fastened on the walls, and the little window through which the agent conversed with the public who occupied the larger room beyond the partition, in company with the stove. A local freight conductor was folding up the bills which the agent had given him and was turning round to go, when the door of the station burst open.

"I say, Frank," said the new comer, to the agent, "I have got a barrel of apples here for Metropolis. Can you get her off to-day? It's for Christmas."

"Can you hold her a minute?" said the agent to the conductor. "I'll have the billing ready for you in no time."

The conductor nodded and ran out, and the agent started in to fill me out.

"From Smithville to Metropolis," said he, then stopping.

"No, I can't bill as far as that; I can only bill to Grand Junction, but they will rebill it through all right. I wonder just what the route is for this; they changed it last week," saying which, he pulled down a book in which were pasted a large number of circulars which he rapidly turned over.

"Here it is!" he cried; so my heading was made out 'From Smithville to Grand Junction via Jonesville and Bingo Junction; for Metropolis via the G. E. R. R.'

By this time the conductor was back for the billing.

"It's nearly ready," said the agent. "What did you say the number of the car was?" and then, with great speed, he wrote down the car number and followed with: "1 bbl. apples for Joseph Yarnall, Metropolis, marked ditto," and then he came to the weight column.

"How much did that barrel weigh?" said he to the conductor.

"Oh, about a hundred pounds, I guess," was the reply.

"Is that all right?" said he to the shipper, who nodded, perhaps with a furtive smile.

"A barrel of apples is second class, I think," he remarked, as he reached up for his official classification.

"Mine are first class," said the shipper.

"Yes, that's all right" said the agent, "you can ship them at first class if you wish to pay a big rate," then running down the list in the classification, he found that a barrel of apples was third class.

"I do not think they have changed the rate," he went on, and then he reached up for his tariff book.

"How soon are you going to have this bill ready?" said the conductor.

"Just a minute" the agent replied, as he turned over leaf after leaf of corrections, supplements and additions. At last he found the rate to Metropolis and this he entered in on me with the division of the receipts between his own line and the G. E. R. R.

"I bet I've got these divisions wrong," said he. "Just wait another minute; I think I got something to-day about them and I do not know where I put it," and he began looking over his desk, which was strewn with notices and letters from the superintendent, the general freight agent, the traffic manager, the general superintendent, the freight and passenger departments and two or three auditors. At last he found a brand new Supplement, No. 98, with something about the rates to Metropolis and it turned out on comparing them with the old one that his particular divisions were not changed; and he was able to tear me off, squeeze me half to death in a press, and give me to the conductor, who, I need not say, left Jonesville at least half an hour late.

The conductor stuffed me into his outside pocket, so that I had a chance to see his gallant attempt to make up the half hour before his "meet" with the Limited Express. Our train had not only to pick up small lots of freight but also to pick up and drop a good many full cars, and as we neared each station the conductor had only to say a word to each of his men and there was no misunderstanding about what they had to do. A couple of them clustered on the pilot of the engine, and each ran to his own switch and turned it, while the other two saw to the coupling and uncoupling of the cars almost without stopping the engine's wheels, and when the new cars were picked up and the train started again the conductor would run along the top of the train peering between the cars to take their numbers. As he came to each station he would rush in and say, with some profanity which I would not repeat, that he wouldn't take anything that the billing was not ready for; and the freight was handled with headlong speed. Advantage was taken of every slightest point, and at last we pulled into the great yard at Jonesville just ahead of the Limited's time.

If I were a car I could give you an accurate account of the number of times I was shifted from track to track and the number of blows I received from cars and engines, but as I am, fortunately for myself, only a way bill, I promptly went into the office adjoining the transfer shed where I stayed for some time. Twice I was taken out to where the men were working with the trucks, and there, for the first time, I saw the barrel of apples which I "covered." After seeing the barrel deposited in a certain part of the shed the clerk simply checked me off with a lead pencil, and the next time he took me out he wrote upon me the number of the car into which the barrel of apples was put. I was then stamped as transferred into the new car, R. L. 11,462, and then with a lot of other way-bills I was put into a large envelope.

I understand that this envelope was sent to Bingo Junction by a passenger train; certainly we arrived there several days before R. L. 11,462 did, for although the envelope was promptly opened on its arrival yet I stayed for a long time in a pigeon-hole. I supposed that I should then be taken to the transfer floor again and should again see a little of life, including my friend the barrel of apples, but the transfer station at Bingo Junction was much larger than that at Jonesville, and accordingly a copy was made of me and I was not allowed to leave the office. At last with the other bills I was taken out of the pigeon-hole again, but when they saw me they said:

"This one is short."

This surprised me at first, because I had always thought myself quite long for a way-bill. I was certainly 24 in. long and only three broad, and many of the other way-bills in the envelope with me were a good deal shorter than I, but it turned out that they did not mean that I was short, personally, but when they had looked into R. L. 11,462, the barrel of apples was short; that is, not found. I was then sent to the desk of a gentleman who was called the "short and over clerk," and he began writing telegrams about me to the claim office, to the general freight department, to the agent at Jonesville, and also to the agent at Smithville. Various replies came which were pinned to me, but the barrel of apples did not come until it was discovered that the clerk at Jonesville had made a mistake. There had been two cars for Bingo Junction, and the barrel of apples had been loaded in the second car and not in R. L. 11,462, and the gentleman who had been conducting the telegraphic correspondence about me had also been sending another lot of messages about a barrel of apples which had been "over" in the other car. When this had been explained to him by the general freight office he was able to pin all the papers together, and the barrel of apples, I understand, went forward via the G. E. R. R. to Metropolis, where I trust it arrived in time for Christmas.

I supposed that when this had been happily accomplished, I should be filed away, until my time should come to go to that bourne from which no way-bill returns. But this was not the case. In less than a month there came a letter from the auditor's department stating that the tissue copy which had been made of me showed that the barrel of apples had been billed at 100 lbs., whereas the minimum weight for a barrel of apples was 150 lbs.; that it had been billed at third class, but as the owner had not signed a release it should have been billed at double first class; also that the rate had been shown as 25 cents a hundred pounds. This had been correct for third-class freight in accordance with supplement No. 76, but the rate had been altered by supplement No. 79, for which the agent's receipt was on file, and, furthermore, that the divisions were incorrect, as supplement No. 96 had been superseded by supplement No. 96½, changing the divisions. The unfortunate agent at Smithville was therefore charged 55 cents in addition to the amount which he had collected from the shipper, and this amount he was respectfully requested to remit at once to the Treasurer. This letter, and the subsequent correspondence, was pinned to me and we were "respectfully referred" from office to office until a pile of correspondence about half an inch thick was collected. As I was at the bottom of the pile I did not have an opportunity to read the papers, but to judge from the expressions used by the people who did read them, I fancy I missed very little. At last I was detached and filed. I am not certain who paid the 55 cents, but have an impression that it figures as "incidentals" in someone's expense account.

When I started in life I was of a beautiful yellow complexion and printed in the blackest of ink. I am now old, worn and tattered. My chief occupation is to count over the holes in my corners made by pins and paper fasteners. There are 43 pin holes and six paper fastener holes, which I think is doing pretty well for a local shipment. If I had been a through bill I doubt if there had been anything left of me by this time.

THOMAS CORAM.

TECHNICAL.

Manufacturing and Business.

The new electric light station of the Pennsylvania Railroad now under construction at the Jersey City Station is to be equipped with Foster valves, the Foster Engineering Co., of Newark, having received orders for two 8-in. regulators, one for steam heating and one for power; for one 6-in. for the Corliss engine; one 2½-in. for air pump, and two 1½-in. for gas compressors.

M. R. Clapp has been appointed Western Agent of the Boies Steel Wheel Co., with office in the Phenix Building, Chicago.

At the recent annual meeting of the Indiana Car & Foundry Co. the following officers were elected: President, Major Collins, Brazil, Ind.; Vice-President, Archer Brown, Cincinnati; Secretary and Treasurer, Emil Pollak, Cincinnati; General Manager, J. C. Fortiner, Indianapolis. The financial office of the company is in Cincinnati. Large contracts for cars have been taken for the Pennsylvania Railroad, World's Fair passenger cars for the Illinois Central and cattle cars for the Hicks Stock Car Company. The works now employ about 500 men.

The following changes in the organization of the

Brooks Locomotive Works at Dunkirk, N. Y., have been made: Frederick H. Stevens appointed Assistant to the President; Robert J. Kennedy, General Foreman; Frank G. Woodman, Acting Foreman of Erecting Shop; William Buras, Foreman of Boiler Department, in place of Frank B. Jackson, resigned; Fred. G. Bird, Assistant Foreman of Boiler Department.

Mr. Holmes Agnew, formerly Manager of the eastern department of the *Railway Age*, has organized the Holmes Agnew Advertising Agency, with offices at No. 29 Broadway, New York.

Crossway & Mullen have a contract to get out 100,000 ties to be delivered at any station on the Denver & Rio Grande between Garland and Wagon Wheel Gap, Col.

Ricker Lee & Co., the well known contractors of Galveston, Tex., are credited in the local papers with an intention to build large creosoting works in Texas.

The De-oxidized Metal Co., of Bridgeport, Conn., has been reorganized and incorporated under the laws of New Jersey as the Bridgeport De-oxidized Bronze & Metal Co., with a capital stock of \$75,000.

The Standard car coupler is to be used on the entire freight equipment of the Great Northern, and the Standard Car Coupler Company has just received an order for the first lot of 12,000 couplers. It will be remembered that we announced some time ago that the Great Northern had decided to equip all of its new cars with M. C. B. couplers and also all old cars receiving general repairs.

A contract has been signed for the occupancy of the Dickie Label Works in Elgin, Ill., by the Mason Air Brake & Signal Co., of Chicago, with a capital stock of \$1,000,000. J. R. Mason is the President. The factory is to begin operations May 1 with 200 hands. The company receives the buildings and land free of cost.

Iron and Steel.

Receivers for the Cofrode & Saylor Co., Incorporated, of Philadelphia, bridge builders and controlling the Reading Rolling Mills, were appointed on Feb. 25, on application of the George W. Bush & Sons Company, of Wilmington; Livingstone Saylor, Robert B. Grimacy, Francis H. Saylor, James McCormick, Henry McCormick, J. Donald Cameron and the Paxton Rolling Mills. The principal creditor is F. H. Saylor, President of the company, whose claim is \$300,000. The court appointed as receivers Joseph H. Cofrode and William G. Harrity. Mr. Cofrode is Vice-President of the Cofrode & Saylor Corporation, as well as Vice-President of the Reading Rolling Mill Co.

The Reading Rolling Mill Co. passed into receivers' hands Feb. 27, upon a bill in equity filed by the Wellman Iron & Steel Co., George W. Bush & Sons Co., Francis H. Saylor, James Boyd & Bro., and L. C. Madeira & Sons. The bill is practically the same as that filed a few days before in the Cofrode & Saylor matter, and alleges that the mill company is insolvent and unable to meet its obligations. J. H. Cofrode and Ellis Ames Ballard were appointed receivers.

The stockholders of the Youngstown Steel Co. have elected the following directors: George Tod, Henry Tod, E. L. Ford, Tod Ford and Paul Jones. The directors elected George Tod, President; Tod Ford, Vice-President; E. L. Ford, General Superintendent; and John Stambaugh, Secretary and Treasurer.

New Stations and Buildings.

The Berlin Iron Bridge Co. is putting up the roof trusses on the new light and power station for the Electric Light & Power Co., at Syracuse, N. Y.

The shops of the West Virginia Central & Pittsburgh, at Elkins, W. Va., are to be enlarged. It is the intention to increase the capacity of the repair department and to equip the plant for building new freight cars.

The Woebler car works, in Denver, were totally destroyed by fire Feb. 22. The loss was \$100,000, insured for \$40,000. Five electric cars of the Denver Tramway Co., valued at \$2,500 each, and 16 cars building for the South Galveston Land & Improvement Co., valued at \$2,000 each, were destroyed. The works will be rebuilt at once.

Washington University Testing Machine.

The newspapers have printed a sensational story of a failure in service of a 1,000,000-lb. testing machine, designed and constructed by Prof. J. B. Johnson, at Washington University. The facts are that the machine was working under a temporary arrangement. Sticks of long leaf yellow pine were being used in tension, temporarily, until money could be raised to replace them by iron. One of these gave way at a knot where there was some cross-grain, on a section 8 in. by 1½ in. at 2,500 to 3,000 lbs. per square inch. The machine was being worked nearly up to its supposed capacity, to crush a 10½ in. x 10½ in. long leaf yellow pine column 17 ft. long. All parts of the machine will soon be made of iron, and then it will have a capacity of 1,000,000 lbs. on a length of 36 ft. or less. The failure occurred with 300,000 lbs. total load.

Electric Mining Locomotives.*

Numerous electrical mining locomotives of the Sperry type are now in use in the Western States. The rails being light and the curves severe, an eight-wheeled engine is used, the wheels being grouped in two trucks, and all being drivers. This engine is capable of running round a curve of 9 ft. radius. A single powerful

*Abstract of a paper read by Mr. Elmer A. Sperry before the American Institute of Electrical Engineers, Chicago, Ill., June 7, 1892.

motor constituting the frame of the car is coupled to the eight wheels by means of special gearing. The axles have ordinary gear wheels, and the driving pinion is placed on a sphere keyed to a shaft which maintains its alignment with the body of the truck. The sphere carries a flattened stud or key which slides in a groove cut on the inner surface of the pinion. This gives a universal motion and is the only pivot used for the truck. None of these gears have yet been replaced after two years' service. Some of these locomotives handle as much as 1,100 tons a day. The rails are often exceedingly slippery from the oil dripping from the mining tub journals. Sand has therefore to be used, but is found not to interfere with the passage of the electricity to the rails, as the first three driving wheels crush it so completely that the fourth obtains electrical contact. The machines obtain the current by means of a trolley and overhead wire. The height of these locomotives is about 36 in., and the weight varies from 8 to 12 tons, according to size, the largest being 150 H. P. The highest voltage is 250. The temperature of the machine is low, not exceeding 60 degrees above the atmosphere on a 10-hour run. The heaviest rail used is 20 lbs. A round trip of 7,000 ft., including switching at both ends, has been repeatedly run in 8½ minutes, part of the road being a 3 per cent. grade against the load. A train of 37 pit cars, weighing 2 tons gross weight each, has been hauled up this grade. A single hand wheel starts, stops, accelerates and reverses motion. A rheostat of iron and asbestos and series fields are used. An elastic medium between trolley wire and roof prevents sparking or wear, as it obviates concussion of the rapidly moving trolley.

Powerful electric headlights are used at each end of locomotive, and the largest size has a stout metal cab to protect men against falls from the roof. A speed of 30 miles per hour has been obtained on a very rough track.

During the discussion, the President, Mr. Frank J. Sprague, observed that the current was as much as would be required by an ordinary locomotive under usual conditions.

Prince Edward Island Tunnel.

Alfred W. Palmer, Assoc. M. Institute of Civil Engineers, London, has submitted to the Hon. Geo. Foster, Dominion Finance Minister, his report on the proposed railroad tunnel under the Northumberland Straits, between New Brunswick and Prince Edward Island, for which he made preliminary surveys last fall. The following is the substance of Mr. Palmer's report: Ten borings varying in depth from 60 ft. to 184 ft. 8½ in. were sunk by diamond drill, and the cores are now in the Geological Museum, Ottawa. The points of landing are on Money Point, slightly northwest of Cape Jourmain lighthouse in New Brunswick and Carleton Point, in Prince Edward Island. The computed distance between them, from shore to shore, is 40,716 feet, while the tunnel itself has a total length of 14,908 yards, or nearly 6½ statute miles. The greatest depth of the water along the line of the tunnel is 16 fathoms, and the soundings indicate a gradual and uniform rise toward both shores. With reference to the grades of the proposed tunnel, 40 feet of cover has been allowed. To economize cost of construction a gradient of 1 in 50, has been laid down in Mr. Palmer's plans, but from an engineering standpoint, and in order to reduce working expenses, he states that a lighter ruling gradient should be adopted. If, as demonstrated by the borings, the formation consists of equal parts of red sandstone and stiff red clay shale, the cover of 40 feet, above referred to, would give a roof of impervious material of at least 20 feet.

Electric Railroads and Telephones.

A case of considerable importance to electric railroads and telephone exchanges was decided in England on Feb. 4 by Mr. Justice Kekewich of the High Court of Justice. The National Telephone Co., who are operating a central exchange system of telephones at Leeds, brought an action against the Leeds Corporation, who own a single trolley electric railroad on the Thomson-Houston system, alleging that the electric tramcars affected the telephone wires to such an extent as to prevent the plaintiffs' subscribers from communicating with one another, and the question was whether the plaintiffs could prevent the defendant from causing this natural electrical disturbance to the prejudice of their telephonic system. The point raised by the action is a novel one in English courts, though it has been much discussed by Parliamentary Committees and in the United States. Judgment was given for the defendants on the ground that though the railroad currents undoubtedly affected the telephone exchange, yet the defendants only exercised their statutory rights conferred by parliament, and used the most practically successful system for working an electric railroad.

A Steam Hammer Afloat.

A small double-acting steam hammer, with a 336-lb. tup has been placed on a floating factory, and the London Engineer states that this is the first instance of a steam hammer being used on shipboard. The hammer is of the overhanging form, with two standards, in which are planed guides for the tup. Taking into consideration the pressure of the top steam, the maximum blow would be equal to 3,000 lbs. falling; the maximum stroke, 17 in.; the diameter of the cylinder being 7½ in. The hammer is fitted with combined self-acting and hand-worked valve gear, and will work very quickly or

slowly, as desired, the change either as to speed or force of blow being effected instantly. The separate anvil block and base are made in one massive casting of great weight, so as to cause as little vibration as possible in the surrounding parts of the ship, and a 6-in. armor-plate is fixed underneath in a vertical position, as a foundation for the anvil block.

Guns and Armor.

The Bethlehem Iron Company has secured the contract for over \$2,000,000 worth of armor plate. The Bethlehem Iron Company and the Carnegies were the only bidders. This assures nearly seven years' work to Bethlehem mechanics in the ordnance department.

The double six-inch gun tube, 82 ft. long, just finished at the Bethlehem works, is regarded as the most skillful piece of forging work in the history of modern ordnance. The tube was made out of a 40-ton ingot by hydraulic forging. The tube will be sent to the Chicago Fair as part of the Bethlehem Iron Company's exhibit. After the Fair it will be brought back and cut in two, forming two six-inch gun tubes, each 31 ft. long.

Two of the seven furnaces for Harveyizing armor plate have been completed at Bethlehem, and the officers detailed to inspect them have sent their reports to Washington. The department contracted with the Bethlehem Iron Works two months ago for the erection of seven Harvey furnaces.

THE SCRAP HEAP.

Notes.

The paint shops of the Southern Pacific at San Antonio, Tex., were burned Feb. 23, together with 15 passenger cars.

A local paper states that the New York, Ontario & Western now requires dispatchers to spell out the numbers of trains in giving telegraphic orders.

The "Oregon State Advertising Association" has been incorporated in that state to run an exhibition car around the country, showing the natural products of Oregon.

Mr. E. Moody Boynton, the hero of the Bicycle railroad, has been presenting his claims lately to the Massachusetts Legislature, and he has asked for a charter in New Hampshire to build a line from Lake Winnepesaukee southward to Massachusetts.

A Texas & Pacific locomotive blew up at Fort Worth, Tex., on Feb. 19, killing or fatally injuring four persons, two others being slightly injured. It is said that the boiler was only 18 months old and that the explosion was caused by defective staybolts.

It is said that the force of train collectors on the Cleveland, Cincinnati, Chicago & St. Louis, will be reduced from 70 to about 40. It appears that these collectors do not run regularly on the same train; some trains have none and those which have them have them irregularly.

Richard H. Neff, a brakeman of the Lake Erie & Western, has received a gift of a gold watch from the company in recognition of heroism on the occasion of the derailment which occurred at Peru, Ind., Jan. 20. It is stated that he will also receive a medal from the State Legislature. Mr. Neff was badly injured.

On March 1 the Denver & Rio Grande Express Company will cease to do business over the Colorado Midland, and the Wells, Fargo & Co. Express resumes operations on that line. Superintendent J. L. Stubbs has had his territory increased. He now controls operations in Colorado, New Mexico, and in Kansas as far east as Dodge City.

World's Fair Notes.

The Western Dummy Railroad Company, builder of the elevated electric railroad at the Exposition grounds, now has its structure in place and has commenced track-laying.

It is probable that an order will soon be issued to allow no more visitors in the Exposition grounds. Much work now remains to be done of such a nature as to be greatly hindered by the presence of visitors, and it is the prevailing opinion that there is now no time to lose.

Judge Grosscup, of the United States Circuit Court has dismissed the injunction suit brought by the Babcock & Wilcox Company to restrain the Director General from giving space to the Stirling Boiler Company for an exhibit, and the Stirling people have accordingly commenced work on their plant.

The first locomotive to enter the Transportation Building for exhibition was the "Pioneer," belonging to the Chicago & Northwestern Railway, and was placed in position on Thursday, Feb. 23. The engine was built in 1836, and was the first engine to run out of Chicago. The transfer from the West Fortieth street yards of the Northwestern was made under steam, Mr. Wm. Smith, Superintendent of Motive Power, acting as engineer.

An order has been issued to department chiefs announcing that no wagon will be permitted to enter the grounds of the Exposition on or after Monday, Feb. 27, unless the width of the wagon ties conform to the regulations of the department of works; namely, not less than three inches wide for one-horse wagons, and not less than four inches wide for two-horse wagons. Exhibits and material sent to the grounds on wagons with narrow tires may, however, be transferred to the transportation department, and delivered at the expense of the exhibitor at the rate of six cents per 100 pounds.

Director General Davis has issued a circular to all exhibitors and associations having permits to occupy space at the exposition who have not already begun the work of installation, requesting that their space be at once prepared for the reception of exhibits and that the exhibits be forwarded without delay. Also that exhibitors who have not applied for service of power, light, water, gas, telephone or other service should make immediate application therefor to the chiefs of depart-

ments if required in the exposition buildings, to the Director of Works if required by a concessionaire, and to the Director General if required in a foreign or state building.

Illinois Steel Company.

Some extracts are given below from the Annual Report of the Illinois Steel Co. for the year ending Dec. 31, 1892:

Net earnings from the consolidation of May 2, 1889.	\$6,117,882.29
Dividends, cash (No. 1).....	\$708,400.56
" " (No. 2).....	\$37,788.00
" " (No. 3).....	888,130.00
	2,129,918.56

Leaving.....	\$3,988,563.73
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Out of which a dividend (No. 4) of 13.51 per cent. was declared Feb. 7, 1893, payable March 10, 1893, in scrip redeemable April 1, 1913, in cash, without interest.....	\$2,519,700.79
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And a dividend (No. 5) of 5 per cent. payable April 1, 1893, in cash.....	932,531.75
	3,452,232.54

Leaving an undivided surplus, as at Dec. 31, 1892, of.....	\$536,331.19
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For the purpose of providing funds for the completion of the new open hearth plant and plate mill now under construction, and for the erection and equipment of a new structural mill and universal mill to meet the growing demands of the company's business, and also to provide the additional working capital necessary for the operation of these new mills, the Board of Directors have decided to issue and sell to the stockholders \$7,000,000 of non-convertible debenture bonds, dated April 1, 1893, running 20 years, and bearing interest at the rate of five per cent. per annum, payable semi-annually at the office or agency of the company in the city of New York.

In order to facilitate the issue and purchase of these debentures, and at the same time to give the stockholders a direct representation in the surplus earnings of the company, the above-described scrip dividend of 13.51 per cent. has been declared. This scrip may be exchanged on or before April 1, 1893, at par, in payment for 36 per cent. of the par value of the debenture bonds, the remaining 64 per cent. to be paid in cash. A circular explaining the details of this transaction will be mailed to the stockholders in a few days.

The company paid in wages and salaries \$6,522,352.57, and employed an average number of men per day of 8,208.

CONDENSED BALANCE SHEET, DEC. 31, 1892.

Credits.	
Capital stock outstanding.....	\$18,650,635.00
Five per cent. debenture bonds.....	6,200,000.00
	\$24,850,635.00
Bills payable.....	\$3,510,704.48
Accounts payable.....	3,856,776.20
Accrued interest and commissions..	156,100.00
	7,623,580.68
Reserve funds for replacements, accidents and contingencies.....	408,040.88
Dividends payable March 10 and April 1, 1893.....	3,452,232.54
Profit and loss (undivided surplus).....	536,331.19
	\$36,865,820.29

Debits.	
Cost of real estate, buildings, machinery and equipment to Jan. 1, 1892.....	\$17,801,618.49
Net additions in 1892.....	399,106.36
	\$18,194,814.85
Materials and supplies on hand.....	\$10,213,390.23
Cash on hand.....	1,014,830.13
Bills receivable.....	824,915.82
Accounts receivable.....	3,264,727.43
	15,317,863.35
Securities on hand.....	\$2,929,838.35
Other investments.....	423,303.74
	3,353,142.09
	\$36,865,820.29

The Peninsular & Oriental Vestibule Train.

A vestibule train is now running between Calais (France) and Brindisi (Italy) in connection with the Peninsular & Oriental Co.'s mail steamers for India, Australia and China. The train consists of restaurant, smoking, sleeping and dining cars, each car being 61 ft. long and 9 ft. 2 in. wide. The dining car accommodates 30 persons at 10 tables, and has a smoking room with seven seats. The partitions and side walls are of polished teak, with fielded panels and moldings. The tables are of light oak, covered with linoleum, the ceilings being of figured oak, in three thicknesses, elaborately hand-painted with Arabesque ornament, fruit and game and bordered with ornamental teak moldings. The monitor roof is glazed with colored glass, opened by handles and protected outside by fine copper wire gauze. The cars are lighted by Pintsch gas. The windows open at the top and slide in brass grooves, the frames being edged with velvet to prevent any rattle, and strips of india-rubber are placed over all joints to exclude draughts. The windows are provided with spring-roller blinds. The white pine floor is covered first with a thick layer of felt, then with linoleum, and on this is laid a Wilton-pile carpet, and along the gangway between the tables is a narrow carpet of hair and worsted. Each table communicates with the pantry by electric bells. The pantry has double doors, and is provided with tables, cupboards, shelves for glasses, ice boxes and washbasin. The two wine cupboards open off the corridor, are fitted with refrigerators, and can carry enough wine for the double journey. The kitchen has a sliding-door opening from the vestibule at the end of the corridor. At the side of the door is a large cupboard fitted up with shelves and containing a refrigerator. The kitchen is furnished with a cooking range, copper, hot and cold water tanks, sinks for hot and cold water, pump for filling the tanks, and all the necessary hooks for kitchen utensils. The kitchen is lined throughout with sheet iron interlaid with asbestos sheets to make the whole fireproof. The cars are heated with hot water, and the furnaces are accessible from the vestibule at the smoking-room end; the pipes are of copper, and run along the sides of the cars under the tables. The car is built on a composite wood and steel under frame, the outside longitudinal timbers being strengthened by Siemens-Martin steel channels in one piece the whole length, and bent at each end to the shape of the covered platform. Each car is mounted on two four-wheeled iron trucks, with oak bolsters. The wheels are Arbel solid pressed, with crucible-steel tires. The cars are fitted with the Westinghouse automatic and the Vacuum and Smith-Hardy brakes. The cars, being of the ordinary 4 ft. 8½ in. gauge, were shipped on their own wheels ready for traffic. The contract for this luxurious train was carried out by Messrs. Brown, Marshall & Co., of Birmingham, Eng.

Car Heating in England.

There is hope that the comfort of travelers in respect of the warming of railway carriages will be better provided for in the near future than it is at present. The begrudged foot-warmers—which are sometimes foot-coolers—are being superseded on the Great Northern and the Manchester, Sheffield & Lincolnshire railroads by a new system of heating, which is far in advance of anything hitherto adopted. In this system steam is taken from the locomotive boiler to storage heaters which are fitted under the seats of the carriages. The heater consists of a metal cylinder containing brine placed within another metal cylinder, the steam being admitted to the annular space between the two. A trial run was made on Wednesday last with a Great Northern train consisting of nine coaches and a dining car which has just been fitted up for service with the new system. We were present on the run, which occupied two hours, and at the finish the temperature had only fallen one degree from what it was just after starting, etc., etc.—*Iron*.

It is unnecessary to tell the Yankee reader that this is the system of the astute and enterprising Mr. Gold.

The Juniata Shops.

The completion of the 200th locomotive at the Juniata shops of the Pennsylvania road, at Altoona, was celebrated by the officers and foremen of the shops by a dinner at the Logan House, in that city, on Feb. 25. Master Mechanic H. D. Gordon was toastmaster. Besides Mr. Ely and a few invited guests, there were present about 40 foremen, clerks and others. According to the bill of fare, the chicken croquettes were made by a 3,000-lb. hammer from "selected scrap," and the roast turkey was "cold sawed, with hardened steel bushings."

The Track Elevation at Elizabeth.

The bad weather of the past week has delayed the work on the Pennsylvania elevation at Elizabeth, N. J. As soon as the foundations can be completed for the crossing bridge at the Jersey street and Morris avenue-Broad street crossings, the trestle for the two east tracks which is already up, and rails laid for all but a few hundred feet at the old union crossing, will be joined by temporary trestle bridges over the crossings and travel will be transferred to it. The two west tracks, which are now used, will then be elevated. The timbers for the uncompleted part of the trestle are being prepared and are about ready to be erected in place.

Lake Street Elevated in Chicago.

President John A. Roche is authority for the statement that the Lake Street Elevated Railroad will have in operation seven and one half miles of road by November next, and that a contract has been entered into with Underwood & Green to construct the remaining part of the road, provide down-town loop facilities and supply 125 passenger cars, 25 locomotives, 48 passenger stations and such machine shops, as are necessary, receiving \$5,150,000 in new Lake Street Elevated five per cent. bonds. It is understood that \$1,000,000 of the new bonds will be used to retire the bonds of the old management, and that \$350,000 of the bonds will remain in the treasury of the company. Mr. Roche says that no negotiations have been entered into either with the Central Elevated Loop Company or the Metropolitan roads.

LOCOMOTIVE BUILDING.

The New York, New Haven & Hartford has purchased four new freight locomotives. This is in addition to the 30 engines ordered to be delivered in March. The locomotives will be 10-wheelers, weighing 75 tons each.

A locomotive embodying several improvements devised by Mr. A. C. Hinkley, Master Mechanic, has just been completed at the shops of the St. Joseph & Grand Island. This engine is especially designed for fast running.

The Central of New Jersey is having five heavy passenger engines, with 20 x 24 in. cylinders, 15 freight engines, 21 x 26 in. cylinders, and five shifting engines, 19 x 24 in. cylinders built by the Baldwin Locomotive Works, for delivery in May and June.

The Schenectady Locomotive Works has received a contract from the Minneapolis, St. Paul & Sault Ste. Marie for building ten consolidation locomotives, and from the Chicago Junction Railways & Union Stock Yards Co. for building 20 four-wheel and ten six-wheel switching engines.

CAR BUILDING.

The Roanoke Machine Works has orders at present for over 800 cars.

The Central of New Jersey is having 25 passenger cars built by the Pullman Car Co.

The Pittsburgh, Shenango & Lake Erie has ordered five new passenger cars and 500 freight cars to be ready in the spring.

The Pennsylvania road has, it is reported, placed orders this week for 2,000 coal cars, most of which will be built at its own shops.

The Gilbert Car Company, of Troy, N. Y., has received an order from the Lake Street Elevated Railroad, of Chicago, for 50 passenger cars.

The Chicago & Calumet Terminal has divided an order for 200 gondolas between the Michigan-Peninsular Car Co., of Detroit, and the United States Rolling Stock Co., of Hegewisch, Ill.

C. M. Hobbs, Purchasing Agent for the Denver & R. Grande, left Denver last week for New York to contract for the building of 450 box cars of 60,000 lbs. capacity and also for 50 stock cars.

The South Baltimore Car Co. has received an order for 50 wooden coal cars from W. J. Chapman, the owner of mines in the Cumberland region. The cars are to be built according to specifications for Baltimore & Ohio Railroad coal cars, each with a capacity of 60,000 lbs.

The Brownell Car Co., of St. Louis, Mo., reports a very encouraging outlook for its "Accelerator" cars. Officers of street railroads in various parts of the country where the cars are in use speak in highly commendatory terms of their ease and rapidity of loading and unloading and of the general design and construction. The North Chicago Street Railroad has had 30 of these cars in use for several months.

BRIDGE BUILDING.

Akron, O.—The Cleveland, Akron & Columbus and the Erie road have, it is reported, made an agreement to construct an overhead bridge across Park street in Akron, which has been proposed for some time, but has been delayed on account of opposition from one of the railroads.

The Canton Bridge Co. has the contract for the Bartges street bridge at \$2,826.

Beaumont, Tex.—The Jefferson County commissioner will build an iron bridge across Taylor's bayou in Jefferson County.

Cincinnati, O.—A bill has passed the Ohio Legislature to erect a bridge over Kenton street at a cost of \$47,000.

Cuero, Tex.—The commissioners have let the contract for the bridge across the river at Hochheim to the Lone Star Suspension Bridge Co., for \$3,785.

Delphi, Ind.—The American Bridge Co., of Chicago, has been awarded the contract for building two viaducts for the Louisville, New Albany & Chicago road near Delphi.

Havana, Ill.—The King Bridge Co., of Cleveland, O., has secured the contract for the Chicago, Peoria & St. Louis Railroad bridge across the Illinois River at Havana, Ill.

Homestead, Pa.—The bill authorizing the construction of a bridge across the Monongahela River, between Homestead and Braddock, and which is to be built by the Carnegie Steel Co., has passed both houses in Washington, D. C.

Latrobe, Pa.—Preparations are being made by the Ligonier Valley road to erect over Mill Creek the first iron bridge on the line. Others will be constructed in the future.

Memphis, Tenn.—The contract for the La Rose street bridge was recently let to the Louisville Bridge Co. for \$5,000. Frank Quigley, of Memphis, Tenn., has the masonry work at \$7,000. This bridge will be built by the Kansas City, Ft. Scott & Memphis, the East Tennessee, Virginia & Georgia and other Memphis railroads.

Pawhuaka, O. T.—Proposals are wanted for erecting four iron or steel bridges across Caney River, Pond Creek, Sand Creek and Bird Creek on Osage Reservation, O. T., by L. J. Miller, U. S. Indian agent.

Pueblo, Col.—Proposals are wanted by the county commissioners until March 14, for the construction of a bridge and viaduct over the D. & R. G. railroad tracks and the Arkansas River on West Fourth street, in Pueblo. Address C. D. Henderson, Clerk Board of County Commissioners, as above.

Raleigh, N. C.—A bill has been introduced in the legislature to incorporate the Piedmont Toll Bridge Co.

Washington, D. C.—The Senate Commerce Committee has reported a bill to permit the Alexandria & Mount Vernon Railway Co. to build a bridge across the Potomac River.

Westtown, Md.—The Philadelphia, Wilmington & Baltimore will build a new bridge over its tracks at Westtown station, on its Central Division.

Youngstown Bridge Co.—The company has contracts for a 1,700-ft. steel highway bridge at Brunswick, Md.; the Bohemia bridge, across Bohemia River, in Cecil County, Md., 1,352 ft. long, 17½ ft. wide, a swing draw 90 ft. long and supported on a stone pier resting on piles; M street bridge, Washington, D. C., across Rock Creek, under-grade truss, 127-ft. span and four trusses divided into ten panels.

RAILROAD LAW—NOTES OF DECISIONS.**Carriage of Goods and Injuries to Property.**

The Federal Court rules that one who without permission has cut cord wood from public lands and piled it along a railroad and who is in actual possession thereof and engaged in selling it for his own benefit, may recover its full value if negligently destroyed by fire from a locomotive; for the railroad company cannot justify its negligence by showing that the plaintiff was a trespasser, or question his title without connecting itself with the true title.

The Supreme Court of Michigan rules that the use of a street by an electric railroad with overhead wires and poles is not an additional servitude for which abutting owners may demand compensation.

The Supreme Court of Colorado holds that a statute which makes railroad companies liable absolutely for stock killed, without regard to the question of negligence or the violation of any statute enacted in the exercise of the police power, and a section which imposes a penalty of double the appraised value of the animals killed, together with an attorney's fee, for failure to pay within 30 days, are repugnant to the constitution of the United States as well as to Section 25 of the state constitution, which provides that no person shall be deprived of life, liberty or property without due process of law.

In Kansas the Supreme Court holds that where railroad tracks are not placed upon plaintiff's land, but the embankment on which they rest extends over and upon it, plaintiff may maintain an action against the road as for a permanent appropriation of the land so occupied, and for damages to the extent of the depreciation in value of her land caused by such appropriation.

In Georgia the Supreme Court rules that the owner of a business stand abutting on a public alley sustains special damage when a railroad company illegally obstructs the alley by building a depot across the same, and customers are thereby prevented from using it as a means of access to the stand, for the purposes of trade, and in a suit to enjoin such obstruction it is no defense that new and increased custom will result by reason of the erection of the depot and other improvements which are to be built by the company near the depot; nor can any increase in the value of plaintiff's property, anticipated as a probable effect of the company's improvements, be set off against the injury.

In South Carolina the Supreme Court holds that a railroad is liable for the misconduct of an engineer in unnecessarily, wilfully and maliciously sounding the whistle and blowing off steam, so as to frighten a horse, and cause him to run away; but not for the misconduct of the trainmen in shouting and yelling at the horse.

The Appellate Court of Indiana holds that a railroad is not liable for damages caused by a horse taking fright at smoke from a locomotive in the streets of a city, where the discharge of smoke was the natural result of coaling the locomotive, and was not caused by the negligence of those in charge of it.

In New Jersey the Chancellor rules that the occupation of land by a railroad company, without compensating or procuring the consent of the owner, will be enjoined, although, by reason of the land having been sold for taxes, the purchaser, under the statute is entitled to the land for the term of 20 years, and no irreparable damage is immediately done the owner.

Injuries to Passengers, Employees and Strangers.

The Supreme Court of Georgia rules that a passenger who has been carried by a road in a passenger car which that road switches off upon the line of a connecting road, sustains the relation of passenger to such connecting road during the time the car is stationary and he remains in it, where according to the usual course of business that company is accustomed to receive presently cars so delivered to it, couple them onto its trains, and carry them over its own line; and such connecting company is liable for injuries sustained by him through its negligence whether at the time of being injured he has procured a ticket or paid his fare for passage over the connecting line or not.

In the Federal Court of Appeals in an action by a passenger for being put off a train at K., nine miles from her destination, because, under the rules of the company, the train did not stop at the latter place, the court approves an instruction which stated that the measure of damages was the price of the ticket she purchased next morning from K. to her destination, and the increased damage suffered by reason of being left at K., instead of at some earlier place, provided that the conductor, by promptly informing her that the train did not stop at her destination, would have enabled her to stop at some other station where she would have suffered less than she suffered at K.

In Georgia a passenger on a car about to be attached to a train was standing on the front platform when he saw the train approaching at a great rate of speed and knew that danger was imminent. He entered the car, but before he gained his seat in the rear thereof he was knocked down by the force of the collision. He testified that he could have stepped off the car and avoided the danger, or taken a nearer seat, and he did not explain his failure to do so. The Supreme Court rules that he was guilty of contributory negligence, and a verdict in his favor would be set aside and a new trial granted.

In the Federal Circuit Court it is held that a sleeping car company not being a common carrier, and its cars being under the control of the railroad company, except as to furnishing lodging to those who may pay for it, the agents of the railroad company are entitled to determine who shall occupy the sleeping cars, as part of the train.

In Iowa in an action for personal injuries to a passenger occasioned by the derailling of a train, it appeared that the engineer knew that a storm had prevailed which had occasioned high water at some points, and there was evidence that the conductor had, just before the accident, betrayed his uneasiness at the rate of speed by several times pulling the bell rope, and tending also to show that if the speed had been 6 miles an hour, instead of 18 or 20, the accident would not have occurred. The Supreme Court holds the railroad liable.

In Georgia the Supreme Court rules that the failure of a conductor on a passenger train to afford to a passenger protection against drunken and violent men, to the extent of the power with which he is clothed by the company or by the law, when he has acknowledged that there is occasion for his interference, will subject the company to liability in damages.

The Supreme Court of North Carolina rules that where the servant of a railroad could have avoided, by ordinary care, injuring a trespasser on the track, it is liable in damages.

In Iowa, the plaintiff was lawfully on defendant's depot grounds, unloading corn into a crib which was near two highway crossings, when defendant's engine passed without signal and frightened plaintiff's team, causing them to run away and injure plaintiff. The Supreme Court rules that under the statute providing that no railroad engine shall approach a highway crossing without giving a signal, and making the neglect to give such a signal a misdemeanor, that defendant was liable, though plaintiff was not attempting to use such crossing.

The Supreme Court of Michigan holds that the fact that a person injured by the failure of a railroad company to repair the highway after constructing its tracks, as required by law, knew its dangerous condition, does not relieve the railroad company from liability for the injury.

In Indiana it is held by the Court of Appeals that where an engineer in approaching a point where it is his duty to sound his whistle under the statute, observes near by a man struggling with a team of horses hitched to a vehicle, and can see from the surroundings that sounding his whistle will render the team unmanageable, and greatly endanger life, it is his duty to desist until the danger point is past, or stop his train.

In Kentucky, upon one of two intersecting streets, were three railroad tracks, two belonging to defendant and one to another company. Plaintiff, a boy 13 years old, was picking up pebbles from the street and examining them while crossing the tracks, and had crossed the track not owned by defendant just ahead of a train going south thereon. While between such track and the adjoining track of defendant, he was struck by a train going north on the latter at the rate of seven miles an hour, and in the act of making a flying switch. The bell was rung, but the engine was running backward, pushing two gondola cars and pulling four box cars. No one was on the front cars, and there was no watchman at the crossing. When the box cars were cut off the speed of the engine was increased, and plaintiff, becoming alarmed at a cry of danger, stepped near defendant's track and was struck by the front car. The Court of Appeals holds that plaintiff was not guilty of such contributory negligence as to prevent a recovery, being guilty of ordinary negligence, while defendant was guilty of the highest degree of negligence where the highest degree of care was required.

In New York the Supreme Court rules that a railroad company, which so constructs a farm crossing as to leave the space between the rail and the plank of unusual size, and large enough to take in the foot of a horse, is liable for any injury resulting.

¹ Northern Pac. R. Co. v. Lewis (Cir. Ct. App.), 51 F. 658.

² Dean v. A. A. R. Co., 53 N. W. Rep., 396.

³ D. & R. G. Ry. Co. v. Outcalt, 31 Pac. Rep., 177.

⁴ Wichita & W. R. Co. v. Feeheimer, 31 Pac. Rep., 127.

⁵ Harvey v. G. S. & F. R. Co., 15 S. E. Rep., 783.

⁶ Cobb v. Columbia & G. R. Co., 15 S. E. Rep., 878.

⁷ Leavitt v. T. H. & I. Co., 31 N. E. Rep., 800.

⁸ Pratt v. Roseland Ry. Co., 24 Att. Rep., 1,027.

⁹ R. & C. R. Co. v. Higgins (Ga.), 15 S. E. 848.

¹⁰ F. & P. R. Co. v. Ludlum, 52 Fed. Rep., 94.

¹¹ R. & C. R. Co. v. Higgins, 15 S. E. Rep., 848.

¹² Lemon v. P. P. Car Co., 52 Fed. Rep., 262.

¹³ Andrews v. C. M. St. P. R. Co., 53 N. W. Rep., 379.

¹⁴ R. & D. R. Co. v. Jefferson, 16 S. E. Rep., 69.

¹⁵ Norwood v. R. & G. R. Co., 16 S. E. Rep., 4.

¹⁶ Longman v. I. C. R. Co., 53 N. W. Rep., 236.

¹⁷ Thayer v. Flint & P. M. R. Co. (Mich.), 53 N. W., 216.

¹⁸ L. N. A. & C. Ry. Co. v. Stanger, 32 N. E. Rep., 209.

¹⁹ K. C. Ry. Co. v. Smith, 20 S. W. Rep., 292.

²⁰ Cotton v. N. Y., L. E. & W. R. Co., 20 N. Y. S., 347.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Northwestern, quarterly, 1½ per cent. on the preferred stock, payable March 23.

Delaware & Hudson Canal, quarterly, 1½ per cent., payable March 15.

West Jersey, semi-annual, 3½ per cent. on the common stock, payable March 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlanta & Charlotte Air Line, annual, New York City, March 8.

Cleveland, Canton & Southern, special, Canton, O., March 29.

Fort Worth & Denver City, annual, Fort Worth, Tex., March 7.

Malone & St. Lawrence, annual, New York City, March 14.

Missouri Pacific, annual, New York City, March 14.

Mohawk & Adirondack, annual, New York City, March 14.

New York & New England, annual, Boston, Mass., March 15.

New York, Susquehanna & Western, annual, Jersey City, N. J., March 9.

Northern Pacific, special, New York City, April 20.

Oregon Short Line & Utah Northern, annual, Salt Lake City, Utah, March 15.

Pittsburgh, Cincinnati, Chicago & St. Louis, annual, Pittsburgh, Pa., April 11.

St. Louis, Iron Mountain & Southern, annual, New York City, March 14.

Sterling Iron & Railway Co., annual, New York City, March 7.

Texas & Pacific, annual, New York City, March 15.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The American Association of General Passenger and Ticket Agents will hold its annual meeting at Cumberland Gap Park, Tennessee, March 21.

The New England Railroad Club meets at the United States Hotel, Boston, Mass., on the second Wednesday of each alternate month, commencing January.

The Western Railway Club meets at the rooms of the Central Traffic Association in the Rookery Building, Chicago, on the third Thursday in each month, at 2 p. m.

The New York Railroad Club meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7:30 p. m.

The Central Railway Club will meet at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of March.

The Northwest Railroad Club meets at the St. Paul Union Station, on the first Saturday of each month, except during June, July and August, at 7:30 p. m.

The Northwestern Track and Bridge Association meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The American Society of Civil Engineers meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

The Boston Society of Civil Engineers meets at Wesleyan Hall, Bromfield street, Boston, on the third Wednesday in each month, at 7:30 p. m.

The Western Society of Engineers meets at 78 La Salle street, Chicago, on the first Wednesday in each month, at 8 p. m.

The Engineers' Club of St. Louis meets in the Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The Engineers' Society of Western Pennsylvania meets at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The Engineers' Club of Cincinnati meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month at 8 p. m.

The Civil Engineers' Club of Cleveland meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the South meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Denver Society of Civil Engineers meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The Civil Engineers' Association of Kansas meets at Wichita, Kan., on the second Wednesday of each month, at 7:30 p. m.

The American Society of Swedish Engineers meets at the clubhouse, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The Engineers' Club of Minneapolis meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The Canadian Society of Civil Engineers meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday except during the months of June, July, August and September.

The Association of Civil Engineers of Dallas meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The Technical Society of the Pacific Coast meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The Tacoma Society of Civil Engineers and Architects meets in its rooms, 201 Washington Building, Tacoma, Wash., on the third Friday in each month.

The Association of Engineers of Virginia holds informal meetings the third Wednesday of each month, from September to May inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

American Association of General Passenger and Ticket Agents.

The thirty-eighth annual meeting of this Association will be held at Cumberland Gap Park, Four Seasons Hotel, Harrogate, Tenn., on Tuesday, March 21. A. J. Smith, of the Lake Shore & Michigan Southern is Secretary of the Association.

American Society of Civil Engineers.

At the meeting of March 1 a paper by G. Bouscaren, M. Am. Soc. C. E., on "The Restoration of the Cable Ends of the Covington & Cincinnati Suspension Bridge" was read.

This bridge was completed in 1867. It has a centre span of 1,057 ft. and side spans of 281 ft. each. The cable system is composed of two main cables 12½ in. in diameter, reinforced by 78 inclined stays 2½ in. in diameter. The anchor chains and cable ends are imbedded in masonry laid in cement. In 1891 it was decided to have the work examined. The masonry of the anchor walls was ashlar faced, with rubble filling laid in Louisville cement mixed with lime, and the whole capped with large stones jointed with pitch.

Each main cable consists of seven strands, each containing 740 iron wires of 3/16 of a square inch sectional area. The ultimate strength of one cable was estimated at 4,196 net tons. Each cable is wrapped continuously with No. 10 wire, the wrapping extending 1 ft. into the masonry. From this point the strands diverge and connect to the anchor chains at 15 ft. back, by 4½-in. pins. Each of the strands divides into four parts, each part being looped around a cast shoe, through which the pin passes.

The masonry was found to be irregular in quality and poorly laid. The mortar in immediate contact with the wires was impregnated with iron rust, which formed a crust around the wires which was removed with difficulty. After removal of the rust, the section of the outside wires was found to be considerably reduced, causing an estimated loss of one-eighth of the strength of the cable. Tests of 12 pieces of wire where they were in the best condition showed 2 per cent. average loss of strength.

To restore the strength of the cables there were attached to each one, four auxiliary iron bars, each 1 x 3 in. section. These were looped over the ends of the pins at the upper ends of the anchor chains, thus giving 24 sq. in. of section, and attached to the cables outside the walls. The outer ends of the bars were threaded, and the bars made taut by screwing up the nuts upon them.

Thirty collars, 4 x 5/8 in., were clamped on each cable with two bolts of 1/2 in. diameter. Each collar was dressed true on the edges and fitted closely to those adjacent, so as to form a continuous sleeve 10 ft. long over the cable. Four 5 x 5-in. angle irons, 5 ft. long, with bars 1½ x 5 in. between, were riveted to the 10 collars furthest from the anchor bars, to form a bearing for the head block against which the nuts upon the auxiliary bars pressed. The head block was made of six steel plates, 2 x 13 x 26 in., dressed on all faces and assembled together, breaking joints, and joined by 20 turned bolts of 1½ in. diameter, with countersunk heads.

The estimated tensile stress in a clamp bolt was 18,000 lbs. Aggregate pressure on the diameter of the cable from 60 bolts = 60 x 18,000 = 1,080,000 = 540 tons. The frictional resistance from the same on 1/3 of the circumference of the cable, supposing a uniform rate of pressure normal to circumference 1/3 x 0.25 x 540 x π = 401.04 " The estimated loss of strength of cable was 525 " The safe working stress of the auxiliary bars being 1/2 breaking strength of all = 120 " Marginal safety of frictional resistance over tension in bars = 3.34 "

The adjustment of the working stress of 10,000 lbs. per square inch in the auxiliary bars was determined by the measured compression of lead cylinders 2 in. in diameter by 3 in. long. These were put under each nut and the power applied to the wrench measured at the time of a compression of 0.6 in. They were then removed and the same power applied to the nut when screwed home, care being taken to thoroughly lubricate all the parts.

To preserve the cables from rust in the future the whole of each cable from the lowest clamp to the end is inclosed in a tight wrought-iron casing. The masonry was then rebuilt, and the casing filled with paraffine oil. The oil used is known as Zone oil, flashing at 350 deg. Fahr. This is so penetrating that it was found to be steadily escaping and finally appeared at the face of the masonry. It was then withdrawn and replaced by paraffine wax which melts at 116 deg. Fahr. The work was completed in 1892, and has proved effective.

Association of Engineers of Virginia.

The annual meeting was held at Roanoke, Va., Feb. 22. The following officers for the ensuing year were elected: President, Chas. Churchill; Vice-Presidents, J. C. Rawa and Prof. J. H. Fitts; Secretary, L. J. Carmalt; Treasurer, J. R. Shick. Directors, Geo. R. Henderson, Geo. P. Wood, R. H. Soule, Clarence Coleman, S. G. Gaillard, M. E. Yeatman. Directors holding over, Prof. D. C. Humphreys, Prof. W. E. Anderson and C. G. Cushman. Mr. René de Saussure read a paper on "The Construction of Theatres from an Optical Point of View," treating the subject geometrically and determining which is the most rational shape to give to the different floors of an opera house or an assembly hall, circus, amphitheatre, etc., in order to give to every one the best possible view of the stage. At the evening session Mr. R. P. C. Sanderson started the discussion by reading a paper on "Heating and Ventilation." He recommended a constant supply of fresh warm air at 72 deg., or thereabouts, the quantity proportionate to the number of persons and gas jets in the room and the pressure greater inside the building than out. This is most nearly fulfilled for dwellings of any reasonable size by the hot air furnace, but for larger buildings steam or hot water systems must be used, supplemented with a fan to produce the necessary circulation of fresh air.

For the informal meeting of March 15 it was announced that the subject would be "Recent Progress in the Substitution of Steel for Other Materials in Construction." Discussion to be opened by Mr. Geo. R. Henderson.

Engineers' Club of Cincinnati.

At the regular meeting held in January there were 22 members present. Col. Latham Anderson was appointed a representative to attend a meeting to be held the following week to discuss the question of a proposed ice harbor at Cincinnati.

Mr. M. D. Burke read a paper on "Country Roads; the Position which their Improvement should Occupy in the Internal Development of the United States." After briefly referring to the growing interest being taken in the subject of the improvement of the roads of the country within the last few years and the benefits to be derived therefrom, Mr. Burke outlined a plan of

organization and the ways and means for carrying it out, for a department of public works which should have charge of certain of the works now carried on by the government through its various departments, and that one of the division would be that of public roads. It would also have direction of the improvement of inland water-ways and drainage and irrigation streams. He would incorporate the coast and geodetic survey in this department on public works and have a system of triangulation extended over the entire United States, the scheme to embrace the planning and execution of all public works in the land, the organization of a corps of United States Engineers which shall establish lines for the basis of all official surveys and maps and design and direct the execution of all works properly belonging to the general government, with the exception of those of a military nature or for coast and harbor defense and fortification.

The part of the organization applying to the location, construction and betterment of the roads of the country was kept well in view throughout the paper and its details clearly set forth. It was proposed that the local work be under the direction of a corps of engineers that might be organized in each of the several states.

The paper was discussed by Messrs. Kennedy, Anderson, Schenk, Whinery and Burke.

Engineers' Club of Philadelphia.

A business meeting of the club will be held on Saturday, March 4, 1893, at 8 o'clock p. m. The paper will be on "Wood Structure and Its Relation to Mechanical Purposes," illustrated by lantern slides by Prof. Joseph T. Rothrock.

A regular meeting was held Feb. 18, 1893, President John Birkinbine in the chair; 68 members and visitors present. The paper was on "The Baldwin Four-Cylinder Compound Locomotives," by Mr. S. M. Vauclain, illustrated by lantern slides and a model working under steam. Descriptions were given of the various types of two, three and four-cylinder compound locomotive engines; also statistics of the work and economy of the Baldwin engine. The paper was discussed by Messrs. Wilfred Lewis, Loss and Christie.

New England Railroad Club.

The annual meeting of the Club will be held at the United States Hotel, Boston, Wednesday, March 8, 1893, at 7:30 p. m. The subject for discussion will be: "Air Brakes, with Special Reference to Their Application to the Front Wheels of a Locomotive."

The American Institute of Mining Engineers.

This body met last week in Montreal, together with the Associations of Mining Engineers of Nova Scotia and of the Province of Quebec. These bodies held separate simultaneous sessions and also joint sessions.

PERSONAL.

—Ex-Senator John H. Reagan and Messrs. L. L. Foster and W. R. McLean have been reappointed Railroad Commissioners of Texas.

—Governor Jones, of Alabama, has appointed Gen. James T. Holtzclaw, State Railroad Commissioner, to fill the vacancy caused by the death of Mr. Levi W. Lawler.

—Mr. John C. Jacobs, who was Superintendent of the Amboy Division of the Illinois Central for a period of over 40 years, died on Feb. 27 at his home in Amboy, after a brief illness.

—Mr. W. D. Sherwood, Master of Transportation, and Mr. David J. Morris, Chief Train Dispatcher, of the Wheeling & Lake Erie, have resigned and will engage in railroad work in Mexico.

—Mr. Morgan W. Torrence who, some years ago, was Division Superintendent of the New York Central & Hudson River road, died at his home in East Aurora, N. J., on Feb. 19, aged 66 years.

—Mr. E. Holbrook, who for the past two and a half years has been Superintendent of the Pittsburgh division of the Baltimore & Ohio, has, it is stated, resigned that position, taking effect March 1.

—Mr. R. C. Hoffman, who has been Vice-President of the railroads of the Seaboard Air Line route for several years, has been elected President of the Seaboard & Roanoke, the Raleigh & Gaston and the Carolina Central, to succeed the late Mr. John M. Robinson.

—Mr. Richard Olney, who is to be Attorney General under the new administration of President Cleveland, is Advisory Counsel of the Boston & Maine, and also General Eastern Counsel of the Chicago, Burlington & Quincy. He is about 58 years old.

—Mr. J. Q. Van Winkle, Superintendent of the Terminal Railroad Association, of St. Louis, has resigned and becomes General Superintendent of the Cleveland, Cincinnati, Chicago & St. Louis, of which road he was formerly General Agent at St. Louis and Division Superintendent at Indianapolis.

—Mr. Donald Allen, who recently resigned as General Manager of the Pecos Valley road in New Mexico, has been succeeded by Mr. J. M. Miller, who was formerly Chief Clerk to General Manager Grant of the Texas & Pacific. Mr. Allen was Division Superintendent of the Houston & Texas Central before his connection with the Pecos Valley road.

—M. Van Rysselberghe, the celebrated electrician, is dead. He was originally a Professor at the School of Navigation at Ostend, and in 1836 was appointed electro-technical adviser to the Belgian Government. M. Rysselberghe is known by his invention of the meteorograph, and by his discovery of the system of employing telegraph lines for telephonic communication, as well as for the transmission of telegraphic dispatches.

—Mr. Thomas Henry Bates died of hemorrhages in Denver, Feb. 21. He was born in Booneville, Oneida County, N. Y., in 1826. He was resident engineer of the Erie Canal at Utica, N. Y., was a division engineer during the construction of the Union Pacific, and was chief assistant engineer under Trenor W. Park in building the railroad across the Isthmus of Panama. At the time of his death he was Secretary to W. A. Hamill, Railroad Commissioner of Colorado.

—Mr. John L. Woodruff, of Westfield, Mass., Assistant Superintendent of the Northampton Division of the New York, New Haven & Hartford, was badly injured near the above named town on Feb. 21, while running a snow plow. Mr. Woodruff was in the cupola of the plow and was struck by a plank which the plow ripped up at a crossing. The injury was a compound fracture of the right leg and will confine Mr. Woodruff to his house for three months at least.

—Col. Richard Vose, the well known manufacturer of car springs, died at Nyack, N. Y., Feb. 25. He was born at Whitesboro, N. Y., in 1830, and when 24 years old was appointed Superintendent of the manufacturing department of the Metallic Car Spring Co., of New York. In 1868 he established the firm of Vose, Dinsmore & Co., and in 1876 its business was transferred to the National Car Spring Co., of which he was elected President. He invented improvements in car springs and amassed a large fortune.

—Mr. Charles Parsons last week tendered his resignation as President of the New York & New England, to take effect on March 14 next, the date of the annual meeting. The resignations of Mr. Charles Parsons, Jr., and three other directors of the Board who were in sympathy with Mr. Parsons, were also tendered at the same time. Mr. Parsons became President of the New York & New England a year ago this March at the annual meeting of the stockholders.

—Mr. George C. Lord, ex-President of the Boston and Maine Railroad, died on Feb. 23 at his home in Newton, Mass. Mr. Lord was born in Kennebunk, Me., in 1823. In 1866 he became connected with the Boston & Maine railroad as a director, and was elected President in 1881. He held the office till 1889, when he resigned. Mr. Lord was a director in the Worcester & Nashua railroad, the York Harbor & Beach railroad, the John Hancock Fire Insurance Co., and in several other institutions.

—Superintendent A. B. Newell, of the Lake Shore & Michigan Southern, has been transferred from the Franklin to the Western division, relieving D. G. Sutfin, who succeeds J. B. Meyer as agent at Chicago and Englewood, the latter having resigned. Mr. H. A. Worcester has been appointed Superintendent of the Lansing division. Mr. A. B. Newell is a son of President Newell, and Superintendent Worcester is a son of Vice-President Worcester. Both began their railroad career as assistant trainmasters. Mr. Newell became Division Superintendent a year ago.

—Mr. Joseph Ramsey, Jr., was elected General Manager of the Terminal Railroad Association of St. Louis at a meeting of the directors last week. Dr. Taussig, President and General Manager of the company, has resigned the latter office and Mr. Ramsey will assume the duties of the position on April 1, when his resignation as General Manager of the Cleveland, Cincinnati, Chicago & St. Louis takes effect. He has already resigned as President of the Dayton & Union and Peoria & Pekin Union roads and as Vice-President of the Indianapolis Union lines, operated by the Big Four company.

—Mr. Walter R. Woodford, whose resignation as General Superintendent of the Wheeling & Lake Erie has already been reported, has been appointed General Manager of the Cleveland, Lorain & Wheeling, succeeding Mr. Oscar Townsend, of Cleveland, resigned. The control of this road was formerly held by the Chamberlain estate of Cleveland, but has recently been purchased by a New York syndicate. As stated last week, Mr. Woodford has been connected with the Wheeling & Lake Erie for over 10 years, and has been Purchasing Agent, Assistant General Manager and for the last few years General Superintendent.

—Mr. J. Q. Van Winkle, General Superintendent of the Terminal Railroad Association of St. Louis, has been appointed General Superintendent of the Cleveland, Cincinnati, Chicago & St. Louis. Mr. Van Winkle was formerly superintendent of the St. Louis Division of the road. Mr. Chauncey J. Stedwell, Superintendent of the Michigan Division of the Cleveland, Cincinnati, Chicago & St. Louis, has resigned. Mr. Stedwell was for a number of years in charge of the Cleveland Division, being transferred to the Indianapolis Division about a year ago, and thence to the Michigan Division. He is succeeded by Superintendent S. T. Blizard, late of the Sandusky Division, which has been placed in charge of Superintendent Thomas Reynolds, of the Indianapolis Division.

—Mr. Robert S. Stevens, who died in Attica, N. Y., Feb. 23, was actively engaged in the development of the Southwest, particularly in the construction of many important railroad systems in Missouri, Kansas and Texas. He went to Kansas before the war to practice law, and soon after he became interested in the construction of railroads, chief of which was the building of the Hannibal & St. Joseph road. One of his most notable achievements was the victory he secured as General Manager of the Missouri, Kansas & Texas in obtaining right of way through Indian Territory to Texas in opposition from two other competing lines. Colonel Stevens was the founder of Denison, Tex. He was President of the Denison & Pacific, and the line to Gainesville was built in 1872 under his supervision. He also built the Denison & Southeastern to Whitewright.

—Mr. Edward B. Wall has been detailed for duty as Assistant to the First Vice-President of the Pennsylvania lines west of Pittsburgh, with office at Chicago. He will have charge of the general interests of these lines (excepting traffic) at that point. Mr. Wall has been connected with the motive power department of the Pennsylvania lines since 1876, in which year he was graduated at the Stevens Institute of Technology. He served for three years as an apprentice in the Pennsylvania shops at Altoona, and was afterward for a few years Material Inspector and Car Designer at the same shops. He has been Superintendent of Motive Power of the southwest lines of the Pennsylvania Co. since 1883.

Mr. Wall has contributed very greatly to improvement in railroad practice, not only by his own work, but as a member of the Master Car Builders' and Master Mechanics' Associations, where he has long stood among the leaders. His singular ability in administration has long been recognized by those who have watched his career closely, and he has now got to a place where it will count.

—Mr. Allen Manvel, President of the Atchison, Topeka & Santa Fe Railroad, died at San Diego, Cal., Feb. 24, of Bright's disease of the kidneys. His death comes as a shock, for although it has been known to many for a good while that his health was impaired, it was not supposed that his life was in immediate danger. We are much in the habit of hearing of men killing themselves by work; but this is a clear case, if there ever was one, of a man having died of an intense devotion to a great responsibility which he had voluntarily assumed. It is probably literally true that Mr. Manvel worked himself to death. He and his immediate friends had realized his danger, and a little less than a year ago he took a short trip to Europe with the hope that rest and change might restore him to health. On his return, although his health was somewhat improved, it was apparent that it was by no means restored, but he plunged immediately into the intricate and wearisome details of

management of the great railroad system of which he was the head. Early in January he went to New York on official business and took a severe cold which intensified his disease, and which was no doubt the immediate cause of his death. About a month ago he went to Southern California with his wife and two of his daughters, expecting that the mild climate and rest might restore him to health or at least prolong his life. Unfortunately, it was too late, and he died at the Coronado Beach Hotel last Friday.

Elected to the presidency of the Atchison, Topeka & Santa Fe Railroad Company in 1889, Mr. Manvel found himself in charge of the largest railroad system in the world. It was a system of great possibilities, but at that time very much embarrassed in its affairs, and needing the strong hand and the steady brain of a capable and able man, such as Mr. Manvel was. It did not seem possible that he could grasp and master the situation, but he did, and in a few months from his accession to the presidency he was as familiar with it as if he had spent years in its service. His most striking characteristic was absolute devotion to his duty. He seemed to have no thought but for the welfare of the great property entrusted to his management. He forgot himself in his desire to advance the prosperity of the stockholders for whom he regarded himself as a trustee, and it may almost be said of him that with full knowledge that his life was being sacrificed he refused to abandon his post or the work which he deemed necessary to the full and proper performance of his duties.

Mr. Manvel was only fifty-six years old at his death. He rose from the foot of the ladder; and his career is a most inspiring one to all who believe that merit can win success. His nature was gentle and unostentatious, but at the same time resolute, courageous and even aggressive when occasion demanded. He never sought popularity, but he gained what is much better, the respect, confidence and affection of his associates and of all who were brought in contact with him. He will be missed not only in railroad circles, but by his many devoted friends who will not soon forget his kind heart, his ready hand and his strong, well-poised intellect.

The following brief outline of Mr. Manvel's career is gathered from the published accounts: He was born in Alexander, Genesee County, N. Y., in 1837. His father was a nurseryman. Young Manvel received a common-school education. When he was sixteen years old he entered a country store and remained there for five years. In 1859 he went to Chicago and entered the employ of the Rock Island Railroad, as a clerk to the purchasing agent. Eventually he was made Purchasing Agent and Assistant Superintendent of the road and finally Superintendent. In this position he remained until May, 1881, when he went to the St. Paul, Minneapolis & Manitoba as Assistant General Manager of the Manitoba Railroad. In 1887 he was elected First Vice-President and Manager of the road, in which position he remained until he went to the Atchison, in 1889.

President J. J. Hill, of the Great Northern, says of Mr. Manvel: "He was one of the most active, industrious and devoted men I have ever met, and his capabilities were phenomenal. He was a man who had come up over all the steps in the ladder, and he knew all of the details of the business, from the lowest position to the highest. He applied himself zealously to the minutest details and not an incident connected with the road or a detail in its management escaped his observation. It was this close observation and application to business which, in my opinion, brought on his untimely death."

ELECTIONS AND APPOINTMENTS.

Alleghany & Kinzua.—The following officers were re-elected at the annual meeting of this company: S. S. Bullis, President; M. W. Barse, Vice-President, and J. E. Rooney, Secretary and Treasurer.

Baltimore & Lehigh.—The road is now being operated by the Baltimore Forwarding & Railroad Co. The present officers are as follows: J. H. Miller, President; W. R. Crumpton, General Manager; I. W. Troxell, Chief Engineer; James Cunningham, Superintendent of Motive Power; J. Summerfield Bull, Acting Freight and Passenger Agent and Acting Purchasing Agent, and W. F. Hanna, Master of Transportation, all with office at Baltimore.

Burlington & Southwestern.—The incorporators of this company, recently chartered in North Carolina, are: W. L. Holt, C. E. McLean, C. C. Townsend, J. H. Holt, Jr., J. W. Menefee, E. S. Parker, J. A. Turrentine, J. D. Kernodle, J. R. Ireland, R. A. Freeman, M. B. Wharton, L. A. Williamson and J. L. Scott, Jr. The headquarters are at Burlington, N. C.

Camden & Atlantic.—At the annual meeting held in Camden, N. J., the following officers and directors were elected: Directors, George B. Roberts, William L. Elkins, Henry D. Welsh, Thomas H. Dudley, Richard D. Barclay, William C. Houston, William Bettie, E. E. Read, Sr., William C. Dayton, Crawford Miller, Enoch A. Doughty, John B. Hay and Samuel Rea. Officers: President, George B. Roberts; Vice-President, William J. Sewell; Secretary, James R. McClure; Treasurer, Robert W. Smith.

Central Elevated of Chicago.—The following have been elected officers of the company: President, George E. Adams; Vice-President, David Kelly; Executive Committee, W. E. Hale, Chairman; Owen F. Aldis, George E. Adams, E. R. Bliss, C. Norman Fay, E. M. Fowler, B. A. Eckhart, all of Chicago.

Chicago & Eastern Illinois.—The General Superintendent announces the following changes: F. L. Corwin appointed Superintendent of the Chicago, Terre Haute & St. Louis Divisions, with office at Danville, Ill., vice R. G. Mathews, resigned; Godfrey Warren, appointed Trainmaster, with office at Dearborn Station, Chicago.

Cleveland, Akron & Columbus.—A. S. Miller, Chief Clerk, has been appointed Acting General Passenger and Freight Agent, in place of H. B. Dunham, resigned.

Cleveland, Cincinnati, Chicago & St. Louis.—J. G. Van Winkle has been appointed General Superintendent of this company, with headquarters at Indianapolis.

On March 1 the jurisdiction of Thomas Reynolds, Superintendent of the Indianapolis Division, was extended over the Sandusky Division, with headquarters at Bellefontaine, O.

S. T. Blizard has been transferred to the Michigan Division, as Superintendent, vice C. J. Stedwell, resigned, headquarters at Wabash, Ind.

The appointment of E. M. Neel, Trainmaster of the St. Louis Division, as Superintendent of that division, vice A. G. Wells, is announced.

Oscar G. Murray's title hereafter will be Vice-President and General Manager.

Columbus, Hocking Valley & Toledo.—H. B. Dunham, who recently resigned as General Freight and Passenger Agent of the Cleveland, Akron & Columbus, has been appointed to a similar position on this road, succeeding W. A. Mills, who has been appointed Assistant to the President, C. C. Waitt.

Detroit Fort Street Union Depot Co.—John E. Smith, Superintendent, has been appointed Purchasing Agent of this company, and also of the Union Terminal Association.

Great Northern.—W. B. Green, Superintendent of the Kalispell Division has resigned, and P. I. Welles, formerly trainmaster, succeeds him as Superintendent, with headquarters at Kalispell, Mont.

Illinois Central.—The office of Superintendent of Terminals at New Orleans has been abolished. The duties of the position have been added to those of Superintendent O. M. Dunn. J. W. Higgins, who has been Superintendent of Terminals, will be transferred to Chicago.

Illinois Railroad & Warehouse Commission.—John W. Yantis, of Shelbyville, has been appointed Secretary of the commission. For the last four years he has been a member of the State Board of Equalization.

Lake Shore & Michigan Southern.—The following changes have been announced: D. G. Sutfin appointed Agent at Chicago, vice J. B. Meyer, resigned; A. B. Newell appointed Superintendent of the Western division, vice D. G. Sutfin, transferred; A. H. Smith, appointed Superintendent of the Franklin division, vice A. B. Newell, transferred; H. A. Worcester appointed Superintendent of the Lansing division, vice A. H. Smith, transferred.

C. A. Sheldon has been appointed Assistant Superintendent of the Michigan Division, with headquarters at Elkhart, Ind. This is a newly created office.

Lehigh Valley.—Alonso Dolbeer, late Superintendent of Motive Power on the Buffalo, Rochester & Pittsburgh, is now in charge of the shops of this road at Buffalo, N. Y. He succeeds V. Blackburn, formerly with the New York, Lake Erie & Western.

Missouri, Kansas & Texas.—J. L. Turner, General Roadmaster, has resigned, and G. W. Petheron, formerly of Grand Rapids, Mich., will succeed him, with headquarters at Denison, Tex.

Monongahela River.—Col. James F. Partridge has been appointed Assistant Superintendent of this road, with office at Fairmount, W. Va.

Monterey & Fresno.—We have received the following list of directors: A. W. Jones, President, Kansas City, Mo.; H. A. Greene, Vice-President, Monterey, Cal.; T. Flint, Bank of Hollister, and W. Palmtag, Farmers' and Merchants' Bank, both of Hollister, Cal.; Alexander Gordon, Farmer's Bank, and C. L. Walter, First National Bank, Fresno, Cal., and W. J. Hill, Salinas, Cal. Frank P. McCray is Engineer in Chief, Neucleus, Building, San Francisco; H. A. Greene is General Manager, Monterey, Cal.

New York, Lake Erie & Western.—S. H. Wenck has been appointed Freight Claim Agent, in charge of the Freight Claim Department, with office at 26 Cortlandt street, New York City. H. S. Burgess has been relieved of the charge of that department.

North Bend & Kettle Creek.—The incorporation of this company was noted last week. The directors are: F. A. Blackwell, Driftwood, Pa., President, and William Howard, A. P. Perley and L. W. Sanders, Williamsport; L. R. Gleason, Canton; I. W. Gleason, Gleasonston, and Charles Gleason, Driftwood, Pa.

Pecos Valley.—President J. J. Hagerman, of Colorado Springs, Col., gives notice that Donald Allen having resigned as General Manager the office has been abolished. Jefferson N. Miller has been appointed General Superintendent, with headquarters at Eddy, N. Mex.

Pennsylvania.—The following changes have been made in the officials of the Pennsylvania Railroad Company, taking effect from March 1: John P. Green, formerly Third Vice-President, has been elected Second Vice-President, vice J. N. DuBarry, deceased. He is to have general supervision of the Treasury, Accounting and Insurance Departments. Charles E. Fugh, formerly General Manager, has been elected Third Vice-President, having charge, under the direction of the First Vice-President, of the Transportation Department. He will also assist the First Vice-President in matters connected with the Passenger and Freight Departments, and also in questions arising with competing lines. He will also have general supervision of all construction work. Theodore N. Ely, formerly General Superintendent of Motive Power, has been appointed Chief of Motive Power, having general supervision of the Motive Power Department of the Pennsylvania. All plans for locomotives, rolling and floating equipment will be submitted to him by the General Manager for his approval as standard. He will be assisted by a General Superintendent of Motive Power with headquarters at Altoona, Pa., but no appointment has as yet been made to fill this vacancy. S. M. Prevost, formerly General Superintendent of Transportation, has been appointed General Manager, having charge of the operations of the Transportation Department. The office of Assistant Chief Engineer has been abolished, and Joseph T. Richards, formerly Assistant Chief Engineer, has been appointed Engineer of Maintenance of Way, having charge of all bridges, etc., on the various lines of the Pennsylvania, and he will personally inspect them. He will also assist the General Manager in all matters pertaining to maintenance of way. The office of Assistant to Second Vice-President has been abolished, and Joseph U. Crawford, formerly Assistant to Second Vice-President, has been appointed Engineer of Branch Lines, his duties being to assist Samuel Rea, Assistant to President, who will have charge of the promotion and construction of new lines of railroad in which the Pennsylvania may be interested. J. B. Hutchinson, formerly Superintendent Maryland Division, P. W. & B. R. R. has been appointed General Superintendent Transportation, having charge of the distribution of the car equipment. E. F. Brooks, formerly Assistant Engineer, New York Division, is made Superintendent Maryland Division, P. W. & B. R. R.

L. H. Barker, Engineer Maintenance of Way of the Philadelphia & Erie Division, has been transferred to the New Jersey Division, to succeed E. F. Brooks, promoted.

Pennsylvania & Northwestern.—The annual meeting was held in Philadelphia this week. The officers elected were: Edward J. Berwind, of Philadelphia,

President; Directors, H. A. Berwind, John H. Converse, Aaron Fries, Stephen Greene, John Reilly and Samuel J. Lewis. Frank S. Lewis is Secretary and Treasurer of the company.

Perry County.—The office of General Superintendent, made vacant by the resignation of F. K. Holtzinger, has been abolished. President C. H. Smiley, of New Bloomfield, Pa., will act as General Manager, and S. H. Beck, Agent at New Bloomfield, Pa., will be Assistant Manager.

Pittsburgh & Castle Shannon.—At the annual meeting the following directors were elected: Jacob Geib, L. S. McKallip, James M. Bailey, J. D. Nicholson, F. F. Schuchman, James R. Redman, F. B. Strunz, Charles Zugsmith, H. T. Morris and J. M. Conroy. Walter Chess was elected President.

Pittsburgh, Marion & Chicago.—C. H. Smith has been appointed General Manager of the road.

St. John Valley & Riviere du Loup.—The annual meeting of the company was held last week at Woodstock, N. B. Geo. F. Baird, W. H. Thorne, James Manchester, H. D. Troop and James Holly were elected directors. Mr. Baird is President of the company, and David Russell, Secretary.

Weatherford, Mineral Wells & Northwestern.—P. E. Bock has been appointed Superintendent and W. C. Forbess General Freight and Passenger Agent of this company, vice A. F. McKay, resigned, with office at Weatherford, Tex.

West Shore.—James Mahar, roadmaster on the Mohawk section of the West Shore railroad, has resigned, and will engage in the contracting business in Amsterdam, N. Y. Mr. Mahar has been roadmaster about 10 years, and superintended the construction of about 30 miles of the road. He will be succeeded by J. H. Summer, of Amsterdam, N. Y.

Wheeling & Lake Erie.—C. A. Wilson has been appointed General Superintendent in charge of the operating and Engineering departments of this road, taking effect from March 1.

RAILROAD CONSTRUCTION. Incorporations, Surveys, Etc.

Aberdeen & West End.—This company will construct at once a branch road from its main line at West End, in Moore County, N. C., running about five miles in the direction of Carthage, the county seat. The contracts have been let. R. N. Page, of Aberdeen, N. C., is Secretary and Treasurer.

Aspen & Western.—This road, built by the Colorado Coal & Iron Co., has been acquired by the Crystal River road, owned by the Colorado Fuel & Iron Company. The road was opened in 1888 and is 13 miles long, extending from Carbondale, Col., to the Thompson Creek mines. The Crystal River road is building from Carbondale and will be about 30 miles long when completed.

Atlantic Coast & Gulf.—This company has been recently organized in Florida, and a charter will soon be applied for to build a road from a point near Cape Canaveral, in Brevard County, through Osceola, Polk, Hillsboro and Manatee counties to a point on the Gulf Coast near Terra Ceia Island. The officers are: Eugene Ellery, President; Wm. Van Fleet, Vice-President and Secretary, and Richard R. Foote, Treasurer, of Canaveral, Fla.

Baltimore & Lehigh.—The officers are arranging to change the gauge of this line as rapidly as possible, and the work will probably be well under way at the first signs of favorable weather. The engineering corps is being organized, and as soon as the estimates are prepared the contracts will be let. The standard gauging will be done by the Baltimore Forwarding & Railroad Company which now operates the line.

Blowing Rock & Lenoir.—A charter for this line has recently been secured from the North Carolina legislature, Edward Jones, of Patterson, N. C., being one of the directors. He states that construction will begin in the spring from Patterson and Lenoir, northwest to Blowing Rock, in Watauga County, N. C.

Burrard Inlet & Fraser River Valley.—Percy Dickinson, of Tacoma, Wash., who is the contractor for this new road, gives the following particulars of the work in British Columbia: "The line is to extend from Sumas, Wash., to Vancouver, B. C., a distance of about 52 miles. Most of the line will be comparatively easy to construct, but from Vancouver to a point eight miles east of New Westminster there is a good deal of rough ground. It is heavily timbered and it is rolling country. We have had surveying parties out, but they have been obliged to give up work on account of the snow. We are buying the right of way now, however, and shall proceed as rapidly as possible. We hope to finish the line within this year. Work may run on into next February, but we hope to get through before. We shall work a force of about 500 men. All the work is to be done under the supervision of the Northern Pacific. There will be a 2,300 ft. bridge on the line across the Fraser River. We shall build the bridge, but shall probably procure the material from the Dominion Bridge Co., of Montreal. The entire cost of the line will be fully \$1,000,000."

Cape May.—The projectors of this road announce that their surveyors, under the direction of Casper W. Haines, Chief Engineer in charge, are surveying the route from Landisville south and southeast to Cape May, N. J., and expect to have the line ready for the beginning of active work early in March. The connection the new road with the Philadelphia & Reading is made at Landisville, and the route to Cape May from that point, 41 miles, it is said, makes the total distance 74 miles, against 81 by the West Jersey. The contract calls for the completion of the line within two months after beginning of work. Logan M. Bullitt, 131 South Fourth street, Philadelphia, is the chief projector.

Central Ontario.—Application has been recently made to the Dominion Parliament now in session for a subsidy for a proposed extension of this line from its present terminus at Coe Hill to Bancroft, Ont., a distance of about 17 miles. No definite information is given concerning the building of this extension by the officers, except that they do not expect to do any work on the line this year.

Chicago & Eastern Illinois.—The newspaper story published last week that surveys were being made for an extension from Shelbyville across Illinois to St. Louis, and that work on the line would begin immediately, is denied by the officers, who state that the report is wholly without foundation.

Creede & Gunnison Short Line.—The charter of this road was filed at Denver last week. The directors are B. F. Kelly, J. G. McConnell, E. W. Hurlburt, Frank Skinner, C. C. Hard and C. A. King, of Creede, Col. Mr. McConnell is President, and B. F. Kelly, of Creede, General Manager. The project has been previously described in these columns. Preliminary surveys have been made by C. A. King, from Creede, Col., to the various mines.

Dunham & Charlotte.—The incorporators of this company, now applying for a charter in North Carolina, are J. S. Carr, W. M. Morgan, W. A. Guthrie and T. L. Peay, of Durham, N. C. The company intends building a road through the counties of Durham, Chatham, Moore, Montgomery, Stanley, Cabarrus and Mecklenburg.

Georges Valley.—The grading has been resumed near Warren, Me., by the contractor, James Mitchell, of Bucksport, Me. The pile bridge across the George's River in Warren, Me., is now being built by J. W. Watts, of Thomaston, Me., who has the contract for all the bridge work. The road is to extend from a junction with the Maine Central north to Union, Me., eight miles, and will be completed by Sept. 1 next. I. C. Thurston, of South Union, Me., is President.

Gladeville.—A contract for building the road has been let to P. J. Millett. The road will be built from a connection with the Louisville and Nashville, near Norton, Va., south via Dorchester to Wise C. H., Va. The road will be seven miles in length. E. M. Fulton, of Wise, C. H., is President.

La Fayette, Vermillion & Gulf.—T. H. Leslie, of Stuttgart, Ark., of the Stuttgart & Arkansas River road, has offered to build during this year a road from Abbeville, La., to La Fayette, to be known under the above name, if a tax is voted by the town of Abbeville and the parish of Vermillion, La.

Lake Superior & Ishpeming.—The right of way is said to have been secured for this road through the Marquette mining region in Northern Michigan, and the directors announce that the contract for building the line will be let in March. The company will build a line 17 miles long from Presque Isle Harbor, just north of Marquette, through Ishpeming and Negaunee, reaching most of the iron mines. Anton G. Hedenpyl, James M. Barnett, John H. K. Burgwin, J. C. Holt, of New York and Grand Rapids, and George W. Hayden, of Ishpeming, Mich., are the incorporators and directors. The surveys have been made by A. J. Wenzell, Chief Engineer.

Louisville & Nashville.—The Log Mountain Branch, recently referred to, leaves the Cumberland Valley Branch of this road just across Cumberland River from Wasioto, Ky., and extends in a southeasterly direction up Big Clear Creek to the canal coal property of the Log Mountain Coal, Coke & Timber Co., a distance of 11.9 miles. The contract for the graduation, masonry and trestling has been awarded to Joseph Coyne & Co., of Louisville, the work to be completed by Aug. 15, 1893. Most of the work is easy, but some heavy bluff work will be encountered. On two of the miles there will be 13 bridges, with from 40 ft. to 100 ft. spans. The maximum grades are 66 ft. to the mile and the maximum curves 16 deg., made necessary on account of a crooked gorge which the line has to pass through. C. O. Bradford, of Louisville, is Chief Engineer of Construction.

Midland Tennessee & Georgia.—J. T. Crass, of Decatur, Ala., is reported to have a contract for a large amount of work on this line. It is understood that the contract includes repair work on the 34 miles of road already built from Booneville, Tenn., south to Alabama state line, and also the extension from Booneville, north to Shelbyville, Tenn., which was surveyed and partly graded a few years ago. This company is a reorganization of the old Decatur, Chesapeake & Nashville.

Missouri, Kansas & Texas.—It was expected that the track laying on the new line to Houston, Tex., would be completed Feb. 27, a temporary bridge having been completed last week over White Oak Bayou, the last bridge to be built on the new branch. The junction will be made at a point about 12 miles west of Houston, and it is said that trains will be running over the line from Hannibal to Houston on April 1. Most of the stations are already built and some of the side tracks in the yard at Houston are laid. The length of the new line is 76 miles long from Boggy Tank east to Houston, which was the eastern terminus of the old branch.

Monterey & Fresno.—A meeting of the citizens was held in the town of Fresno, Cal., some days ago to confer with the projectors of the line, who have asked for a subsidy of \$75,000 from Fresno County. They state that they have been assured that \$50,000 would be subscribed to the stock in Monterey County and in San Benito County. The people of Fresno, however, want some guarantee that the road, if built, will not be leased to the Southern Pacific. The projectors say that the preliminary survey has been completed for about 100 miles of the line. An engineering party of 15 men is now surveying in the mountains. The route for the proposed road is from the port of Monterey easterly through the towns of Salinas, San Juan and Hollister to Fresno, Cal., about 150 miles. The only important iron bridge will be across the Salinas River, and three short tunnels will be necessary. A depth of 30 ft. of water at low tide can be secured at Monterey by building a 1,600-ft. wharf. H. A. Greene, of Monterey, Cal., is the General Manager.

Nevada Southern.—Grading on the first division of 30 miles from Goffs, west of The Needles, Cal., to Manvel Junction has been completed, and all the rails are on the ground. The company has ordered passenger cars and will use the freight cars of the Atchison, Topeka & Santa Fe for the present. No motive power has yet been ordered; one train a day will be run. Surveyors are locating a route through New York mining district toward Ivanpah, and this line will be built this year. The company has a contract with one mine at Manvel for 100 tons of ore a day, and a tonnage of 531 tons a day has been estimated as the present outlook.

Newport & Sherman's Valley.—The local papers report that negotiations are pending looking toward the changing of the gauge of this road from 3 ft. to standard. The company now operates about 29 miles of road from Newport, Pa., to New Bloomfield, the entire line having been completed in the last three years.

New Roads.—J. J. Hines, of Riverdale, N. C., is the chief projector of the proposed road from Swansboro northeast to Riverdale, N. C., to connect with the Atlantic & North Carolina road, the distance being about 25 miles. The country between these towns is level, and

the only important stream is White Oak River, about 400 ft. wide, with marshes of perhaps a quarter of a mile on either side.

The Texas State Board of Penitentiaries is building a narrow gauge road about five miles long from Huntsville, Tex., southeast to a lumber tract, and it is expected to have it in operation early in May. The line may be extended in the near future to connect with the Gulf, Colorado & Santa Fe.

New York, Chicago & St. Louis.—Within a few weeks a junction will be made between the main line of this road and the old main line of the Lake Shore & Michigan Southern at Dunkirk, N. Y., and the company will then use the old Lake Shore track between Dunkirk and Silver City, 10 miles, as a double-track line. At present the only train running over this old track is a way freight. All the other trains of the Lake Shore & Michigan Southern are run over the new cut-off built last year, called the Silver City & Dunkirk.

North Carolina Roads.—Bills have been introduced in the state legislature to incorporate the following roads: Neuse River & Swansborough; Columbia, Charlotte & Winston; Polk County; Durham & Siler; Blowing Rock & Lenoir; Charlotte, Troy & Sanford; Western North Carolina & Atlantic; Rutherford & Polk County, and Elizabeth & Pasquotank and the Burlington & Southwestern, to build a road from a point on the North Carolina Railroad in Alamance County to a point on the Cape Fear & Yadkin Valley road.

Northeastern Elevated (Philadelphia).—The city board of highway supervisors of Philadelphia have authorized the company to break ground for the work on Front street between Market and Vine streets and the contract for the foundations for the road between these streets will be let at once.

Ohio Southern.—The contractors are reported to have completed the grading for nearly 30 miles from Springfield, northwest toward Lima, O. The entire distance between these points is 60 miles. President Saul spent some time at Lima recently arranging for the terminals of the road at that point, and as soon as that matter is settled the work will be more actively pushed.

Perry County.—A branch three or four miles long will probably be built within the next few months from Landisburg, Pa., to the Warm Springs summer resort, recently purchased by a Philadelphia syndicate. It is also said that the main line will be continued from Landisburg southwest to connect with the Cumberland Valley near Newville, Pa., the extension to be by way of Doubling Gap in the Blue Mountains and Cloverdale Lithia Springs.

Roanoke, Fincastle & Clifton Forge.—The Chesapeake & Ohio Railroad Company is said to have made a proposition that if the city of Roanoke, Va., would subscribe \$100,000 to the capital stock of the above company, the Chesapeake & Ohio would construct a road from Salisbury, on the Richmond & Allegheny division, southwest to Roanoke, about 25 miles. The city council will probably order a town election, but there is some opposition to voting the subsidy. Joseph T. Engleby, of Roanoke, is President.

St. Louis Terminal.—This company has been organized to build an extension of the Belt Line of the St. Louis Merchants' Bridge Terminal Co. through the city of St. Louis, Mo. The route of the proposed road was explained to the city council of St. Louis last week by Major C. C. Rainwater, President of the company, and it is expected that the necessary ordinances will be readily granted.

Santa Fe, Prescott & Phoenix.—A recent report of the progress of the construction work on the northern section of the line states that with favorable weather the work will be completed to Prescott early in April, the latter town being about 80 miles south of Ash Fork, Ariz., on the Atlantic & Pacific. The greater part of the grading south to Phoenix, which is nearly 200 miles from Ash Fork, will probably be completed in 1893.

Seattle & Northwestern.—The incorporation of this company in Washington was briefly noted last week. The chief local projectors are John Leary and Judge Thomas Burke, of Seattle, Wash. As already stated, the route is from Seattle in a northeasterly direction to a connection with the Great Northern near Everett, Wash. Mr. Leary told a reporter that it was intended to begin work in the summer and complete the road during the year. "It will be about 60 miles long and will pass through the Cherry Valley country. It will shorten the Great Northern's present line about 30 miles. We have had two surveys made. One survey was made northeast from Ballard and the other around Lake Washington."

Shelton Southwestern.—About eight miles of this line is now in operation from Shelton, Wash., and bids have been asked for the clearing and grading of two miles additional, including some heavy work, and the rails will be laid for this distance as soon as the grading is finished. The names of the officers are as follows: John Snyder, President; Anthony J. Hayward, Vice-President; Edwin E. Crowell, Secretary, and Charles S. Crowell, Treasurer, all of Shelton, Wash.

Southern Pacific.—Chief Engineer Hood states that 600 men have been at work on the Coast extension all through the winter south of Santa Margarita, Cal., and he says that the present force will be largely increased or doubled in a few weeks. Mr. Hood says that no estimate can be made of the time when the division will be completed, but that it will certainly not be this year. The section on which the contractors are now working is the first 16 miles from Santa Margarita to San Luis Obispo, which includes considerable tunnel work.

Tacoma, Lake Park & Columbia River.—J. D. Miller, Secretary of the road, is on his way to New York City to arrange for the issue of bonds to extend the line toward the Columbia River. The most of the stock is owned by William Bailey, of 45 Broadway, New York, who, it is said, has about completed the necessary negotiations for placing the bonds. The road will be built through the Cowlitz Pass to some point, not yet decided, on the Columbia. The line to the Columbia River will be about 140 miles long and will cost \$20,000 a mile. The first work which will be done, however, will be to place heavy rails on the line from Center street, Tacoma, Wash., to Spanaway Lake. Active operations will likely be begun during the approaching season.

Tampa & Northern.—A charter has been applied for by this company, which proposes to build a road from Tampa northeast to Owensboro, a distance of about 40 miles. James H. Neff is President; N. P. Baker, Vice-President, and D. L. Powe, Secretary and Treasurer, of Tampa, Fla.

Texas Central.—Various propositions have been made to the directors for a branch to the Thurber coal fields in Erath County, Tex., and they now have the building of such a line under consideration. No definite action has yet been taken, but it is thought that the line will be built this year. Two surveys have been made, one from Mt. Airy, seven miles west of Dublin, Tex., to Thurber, a distance of 32 miles, and one from Dublin to Thurber, a distance of 37 miles. A survey is now being made from Alexander, nine miles east of Dublin, through Stephenville, the county seat of Erath County, to Thurber, which will be about 40 miles long.

Texas & Gulf.—L. W. Lloyd, of Marshall, Texas, one of the projectors of this newly chartered company, states that active work will soon begin between Marshall and Centerville, in Shelby County, Tex., about 60 miles. The charter is for a line from Marshall on the Texas & Pacific, south through Eastern Texas to the Gulf of Mexico, nearly 200 miles.

Toms River & Barnegat.—Recently the Toms River & Waretown Railroad filed a transfer of its interest in that part of the road between Toms River and Barnegat, N. J., to J. Rogers Maxwell, President of the Central of New Jersey. Since then the above company has been organized and filed articles of incorporation in New Jersey. The incorporators are J. Rogers Maxwell, George F. Baker, Robert W. De Forrest, Stephen M. Williams, Hiram P. Baldwin, Samuel Knox and Peter H. Wyckoff, officers of the Central of New Jersey. The road will be 15 miles in length.

Tuscaloosa Iron, Coal & Land Co.—Last week a contract was closed for the building of the Tuscaloosa Northern from Tuscaloosa, Ala., about 20 miles, to the Warrior coal fields, along the Warrior river, connecting at Brockwood with the Birmingham Mineral road. The contract was awarded to J. W. Woolfolk, who built the Alabama Midland, and is now President of the Montgomery, Tuscaloosa & Memphis.

Union.—J. W. Shelton, W. T. Wright, F. Nodine, J. M. Phy and T. B. H. Green, of Union, Or., are the incorporators of this new Oregon company. The object is to build a road to the timber belt east of Union and thence to Eagle Valley, Or.

White Plains.—A charter for this company has been issued in New York, with Chauncey M. Depew, H. Walter Webb and John M. Toucey and other officers of the New York Central & Hudson River road as incorporators. The proposed road is to be two miles long and extend through the town of White Plains, N. Y., from a point on the New York & Harlem to the new buildings of the Bloomingdale Asylum near that place.

GENERAL RAILROAD NEWS.

Altoona, Clearfield & Northern.—The litigation between James Kerr, Clerk of the House of Representatives at Washington, D. C., and Samuel P. Langdon, of Philadelphia, for the control of this road, came up for review in the Blair County Courts at Hollidaysburg, Pa., this week. The injunction restraining the transfer of 60 per cent. of the capital stock of the company to Langdon was dissolved by order of the court. The road now extends from Juniata to Wopsononock, Pa., eight miles. It was claimed that President Patterson, acting under a resolution adopted by the Board of Directors, agreed to sell a majority of the stock to Kerr, but that the directors sold the majority stock to Langdon before the agreement could be concluded. At the annual meeting at Altoona, Feb. 3, each faction elected a Board of Directors and officers and the courts must decide which party is entitled to possession of the property. At present the road is closed by snow.

Augusta, Gibson & Sandersville.—This narrow gauge road extending from Augusta to Sandersville, Ga., 80 miles, was sold at foreclosure at Augusta on Feb. 20, and was purchased for \$250,000 by James U. Jackson, of Augusta, for the Central Trust Company of New York, trustee of the mortgage bonds. It is reported that when the new company is organized the gauge of the road will be changed to standard and an extension built to connect with the East Tennessee, Virginia & Georgia.

Bradford, Eldred & Cuba.—This road, which was purchased by Mr. August Stein, of New York City, on Jan. 25, will be abandoned and the rails taken up, and these together with the rolling stock disposed of. F. M. Baker, of Addison, N. Y., is to act as agent for the purchaser, and dispose of the property.

New York, Lake Erie & Western.—The statement of the earnings and expenses of this company for the month of January, and the three months to Jan. 31, is given in the following table:

	1893.	1892.	Inc. or dec.
January 31.			
Gross earnings.....	\$2,194,861	\$2,186,570	I \$8,291
Oper. expenses.....	1,619,101	1,732,333	D 83,232
Net earnings.....	\$575,760	\$454,237	I \$121,523
Due to leased lines.....	127,442	189,572	I 16,570
Net earnings.....	\$348,318	\$273,665	I \$74,652
Oct. 1 to Jan. 31.			
Gross earnings.....	\$10,075,714	\$10,386,301	D \$310,587
Oper. expenses.....	6,796,061	7,219,645	D 423,583
Net earnings.....	\$3,279,653	\$3,166,656	I \$113,016
Due to leased lines.....	919,639	897,514	I 22,125
Net earnings.....	\$2,360,014	\$2,269,142	I \$90,871

Old Colony.—The special stockholders' meeting called to vote upon the lease to the New York, New Haven & Hartford met in Boston on Feb. 23, the lease being approved by a vote of 87,092 shares to 539 shares against approval.

Pennsylvania.—The statement of earnings for January of Eastern lines is as follows:

	1893.	1892.	Inc. or dec.
Gross earn.....	\$1,923,216	\$5,019,741	D \$3,096,525
Oper. expen.....	4,422,940	3,945,189	I 477,751
Net earn.....	500,306	\$1,074,552	D \$574,246

Net earnings in 1891 were \$1,447,219. Western lines for January show a gross decrease of \$55,782 and a net decrease of \$254,269, making a net decrease for the system for the month of \$828,515.

Philadelphia & Reading.—The statement of the company for January, 1893, shows: Gross traffic receipts, \$1,505,780; traffic expenses, \$1,183,020; profit in operating, \$322,760; receipts from other sources, \$57,567, leaving profit for the month \$380,227. Against this is charged \$20,062 for permanent improvements, and \$650,000 as one-twelfth of the current year's fixed charges, thus showing a deficit for the month of \$239,734. The result

of the operation of the Philadelphia & Reading, lessee of the Lehigh Valley railroad for December, 1892, shows: Receipts, \$1,760,554; expenses, \$1,171,081, leaving earnings for the month \$589,472, an increase of \$188,541, as compared with December, 1891.

Port Royal & Augusta.—The appointment of J. H. Averill, Superintendent of the road, as Receiver was confirmed last week by Judge Aldrich, of the State Circuit Court. This order places the road in the hands of two receivers representing conflicting interests, the other receiver being H. M. Comer, of the Central of Georgia. The State of South Carolina, which is complainant in the present litigation, will apply to the United States District Judge at Charleston, S. C., to set aside the appointment of President Comer, and to make Averill the Receiver, and incidentally to abrogate the lease of the Port Royal Railroad to the Central of Georgia.

San Francisco & North Pacific.—Sidney Smith and A. B. Foster, acting for the banking firm of J. & W. Seligman & Co., of New York, last week purchased the 42,000 shares of the stock of the company, belonging to the estate of the late Col. J. M. Donahue, which were sold at auction by order of the court. The first bid was \$11 a share, the sale being made at \$20.25 a share, or \$850,500. The road operates 162 miles of road, the main line extending from Point Tiburon, Cal., opposite San Francisco north, a distance of 106 miles. The funded debt is \$4,150,000, most of which was created four years ago, the bonds being sold through the firm of Seligman & Co.

Union Pacific.—The earnings for the month of December and the year 1892 are reported as follows:

	1892.	1891.	Inc. or Dec.
Month of December.			
Gross earn.....	\$3,722,014	\$3,750,867	D \$28,853
Oper. expen.....	2,553,702	2,533,065	D 20,637
Net earn.....	\$1,168,312	\$1,217,802	I \$49,490
Twelve months to Dec. 31:			
Gross earn.....	\$45,025,176	\$44,006,731	I \$1,018,446
Oper. expen.....	28,513,793	28,680,519	D 166,726
Net earn.....	\$16,511,383	\$15,326,212	I \$1,185,201

Earnings of various divisions of the system are given below:

OREGON SHORT LINE & UTAH NORTHERN.			
December.			
Gross earn.....	\$574,711	\$611,395	D \$36,683
Oper. expen.....	361,071	374,006	D 12,935
Net earn.....	\$213,700	\$237,389	D \$23,688
Year.			
Gross earn.....	\$7,201,199	\$7,574,456	D \$373,257
Oper. expen.....	4,298,650	4,574,151	D 275,500
Net earn.....	\$2,902,548	\$3,000,305	D \$97,756

UNION PACIFIC, DENVER & GULF.			
December.			
Gross earn.....	\$506,214	\$443,184	I \$63,029
Oper. expen.....	367,458	364,552	I 2,905
Net earn.....	\$138,756	\$78,631	I \$60,124
Year.			
Gross earn.....	\$5,885,526	\$5,746,964	I \$138,561
Oper. expen.....	4,418,537	4,284,471	I 134,065
Net earn.....	\$1,466,988	\$1,462,492	I \$4,496

UNION PACIFIC SYSTEM PROPER.			
December.			
Gross earn.....	\$3,588,936	\$3,583,203	I \$5,733
Oper. expen.....	2,460,300	2,504,115	D 43,815
Net earn.....	\$1,128,636	\$1,079,087	I \$49,548
Year.			
Gross earn.....	\$43,135,098	\$42,699,587	I \$435,510
Oper. expen.....	27,216,237	27,698,896	D 482,659
Net earn.....	\$15,918,860	\$15,090,691	I \$828,169

Washington Southern.—Colonel Sheafe, of Seattle, has been appointed Receiver of this road which now operates about 30 miles of a logging road from Shelton, Wash., through Satsop County. There is said to have been a disagreement for some time among the directors as to the operation of the line, and many claims have accumulated against the property. President J. B. McDonald of Seattle spent several months in Europe last year endeavoring to negotiate bonds for a proposed extension of the road.

TRAFFIC.

Traffic Notes.

The Board of Trade of New Orleans is considering the project of establishing a freight bureau.

The Northern Mississippi Emigration Society has recently taken a party of 200 farmers from Illinois over the Mobile & Ohio to look at the "black prairie" lands of Mississippi.

The railroads of Georgia have made formal application to the State Railroad Commissioners for leave to raise rates 25 per cent., the reason given being that in the existing depression of general business they are unable to earn their fixed charges.

The report recently published that a through train would be run between Texas and Chicago, over the Iron Mountain route, seems to have been premature, but it is now announced that the Missouri, Kansas & Texas will put on a fast train between Galveston and Chicago.

A contract has been made by the Pittsburgh, Shenango & Lake Erie to furnish the Canadian Pacific with 100,000 tons of soft coal next season. The coal will be run over the new line of this company to Conneaut Harbor, and thence be shipped by boat to Port Colborne. General Manager Blair, of the Pittsburgh, Shenango & Lake Erie, and H. K. Wick, who is operating the coal interests along the line of the road, closed the contract in Toronto.

The Buffalo Courier, which seems to have some way of getting "inside information" about the doings of the Trunk Line Association, reports that the question of commissions on passenger business has been the subject of a large amount of discussion lately, some of it slightly acrimonious. The officers of the Central Traffic Association have been investigating the scalpers at Chicago, and find that selling tickets to New York at \$1.50 (or more) less than the tariff rate has come to be a very systematic business, the ticket brokers issuing rate sheets in usual form. The Commissioner of the passenger department finds that the differential-fare lines are paying \$3 commission from Chicago to New York. This irregularity exists at many other prominent points besides Chicago. The report made by this Commissioner shows that of 11,000 passengers delivered by Western lines, at Chicago, to the Eastern lines for New York, during nine

months ending Oct. 1, the different eastern lines received as follows:

	Per cent.
Michigan Central.....	12.5
L. S. & M. S.....	22.
Pennsylvania.....	14.
Baltimore & Ohio.....	9.
Chicago & Grand Trunk.....	15.
Chicago & Erie.....	14.5
Niagara Falls Short Line.....	13.

Thus it will be seen that two strong lines, the Michigan Central and the Pennsylvania, suffered at the hands of the Grand Trunk, the Erie and the Wabash.

Chicago Traffic Matters.

CHICAGO, March 1, 1893.

Affairs in the Southwest are becoming strained over rates to Washington for the inauguration, and a general reduction from the established rate of \$26.75 from Kansas City has been feared for some days. There is little doubt that secret cuts of several dollars have been made from Kansas City over the Ohio & Mississippi and the Baltimore & Ohio. It is intimated that the Missouri Pacific was the offending line, but the officials of the Missouri Pacific deny it.

A meeting of the Committee of the Western Passenger Association to consider World's Fair rates was held yesterday. This report will be presented to the regular monthly meeting of the association, at which time also the report of the Committee on Reorganization is expected.

The Eastern lines continue to have offered more freight than they can handle, owing to the inconvenience caused by the stormy weather, but they will probably have the lines clear by the end of the week and be able to accept all freight offered.

The shipments of eastbound freight, not including livestock, from Chicago, by all the lines for the week ending Feb. 25 amounted to 75,315 tons, against 75,603 tons during the preceding week, a decrease of 318 tons, and against 97,074 tons during the corresponding week of 1892. The proportions carried by each road were:

Roads.	W'k to Feb. 25.		W'k to Feb. 18.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	11,792	15.7	12,685	16.8
Wabash.....	7,063	9.3	5,896	7.8
Lake Shore & Michigan South.....	13,395	17.8	12,461	16.5
Pitts., Ft. Wayne & Chicago.....	9,949	13.2	12,652	16.7
Pitts., Cin., Chicago & St. Louis.....	4,694	6.2	4,322	5.7
Baltimore & Ohio.....	5,566	7.4	5,230	6.9
Chicago & Grand Trunk.....	7,587	10.1	7,459	9.8
New York, Chic. & St. Louis.....	4,985	6.6	5,553	7.3
Chicago & Erie.....	8,801	11.7	7,110	9.4
C., C. & St. Louis.....	1,538	2.0	2,322	3.1
Totals.....	75,315	100.0	75,603	100.0

Of the above shipments 11,521 tons were flour, 38,813 tons grain and millstuff, 6,623 tons cured meats, 10,468 tons dressed beef, 2,032 tons hides, and 3,746 tons lumber. The three Vanderbilt lines carried 40.1 per cent., and the two Pennsylvania lines 19.4 per cent.

Proposed Restrictions on Freight Coming through Canada.

Representative Hitt, of Illinois, has introduced in Congress a bill embodying the recommendations made in the recent message of President Harrison on Canadian relations. The bill is a long one, revising and amending the laws establishing intercourse and relations with the Province of British North America and the Republic of Mexico.

Section 1 requires merchandise carried from one port of the United States to another port therein, through Canada, to be in sealed or closed cars, in the custody of regular inspectors of customs, of whom there shall be two to each train, and to be examined by the customs officers at the port of destination. The President says these sealed cars now engaged in this traffic while in foreign territory are not adequately protected, and that such cars are now delivered directly to the owner or consignee, on arrival at destination in this country, without the supervision of a revenue officer, which, he says, is inconsistent with the safety of the revenue. [Most or all of the goods thus handled are commodities which come in free of duty.]

Section 2 provides for the transit in bond of outgoing merchandise from Canada through ports of the United States for export. The present law only provides for incoming transit in bond.

Section 3 provides that merchandise, the product of a contiguous foreign country and none other, arriving under consular seal, shall be closed or sealed by the customs officers at the first port of arrival in the United States, and then be accompanied by two inspectors to the port of destination and there duly examined and delivered. Such merchandise shall be valued for duties as originating in Canada. The President says the consular seal practice not only equalizes Canadian ports with our own as ports of entry, but makes them favored. Under the existing practice there is less detention than is required at United States seaports. This has tended to divert Chinese and Japanese traffic from San Francisco to Vancouver. It also exposes the revenue to frauds committed by persons beyond jurisdiction or punishment.

Section 4 requires the manifests of all cars crossing the border to give such information or facts as may be prescribed by the Interstate Commerce Commission tending to reveal violations of the Interstate Commerce act.

Section 5 requires every foreign road doing business across the border to have a license or permit from the Interstate Commerce Commission, for which it shall make formal application, with a stipulation that it will obey the Interstate Commerce act and the revenue laws as if the traffic were within the United States, which license may be suspended by the Interstate Commerce Commission upon a willful violation of that act. Upon such suspension the commission shall notify the Secretary of the Treasury, who will direct the customs officers to prevent the further passage of the cars while the license remains suspended.

Section 6 authorizes the Secretary of the Treasury to make regulations touching this traffic to protect the revenue and prevent preference of foreign ports, and the Interstate Commerce Commission to make regulations to secure equality between common carriers within and beyond the United States.

Section 7 authorizes the President, on 30 days' notice, to suspend any portion of the Interstate Commerce law that places at disadvantage a domestic in competition with a foreign common carrier in equal competition, and in order to secure equality of restrictive rules upon foreign and domestic companies.